HOW WE ARE CLOTHED

A GEOGRAPHICAL READER

CHAMBERLAIN

HOW WE ARE CLOTHED


The

HOME AND WORLD SERIES

HOW WE ARE CLOTHED

A GEOGRAPHICAL READER

BY

JAMES FRANKLIN CHAMBERLAIN, Ed.B., S.B

DEPARTMENT OF GEOGRAPHY, STATE NORMAL SCHOOL
LOS ANGELES, CALIFORNIA
AUTHOR OF "HOW WE ARE FED" AND "FIELD AND LABORATORY EXERCISES IN PHYSICAL GEOGRAPHY"

New York
THE MACMILLAN COMPANY
LONDON: MACMILLAN & CO., Ltd.
1920

Set up and electrotyped. Published September, 1904.

PREFACE

The character of our schools is determined by our educational ideals. That these ideals are steadily advancing is evidenced by the remarkable change in the content of the school curriculum during the last decade, as well as by the change in the method of instruction.

Education becomes vitalized as we recognize its connection with the desires and needs of life —as we make it a part of life. The application of this principle is particularly important in elementary school work.

In the commodities and the activities which have to do with supplying man with the necessities and the comforts of daily life, children are greatly interested. In making the industrial a phase of our elementary instruction, however, the thought goes deeper than the mere materials and activities by means of which food, clothing, and shelter are obtained. This

study opens the way to an understanding of the geography of the home and the world, and of the influence of environment on the physical, social, and moral development of human life.

Geography, more naturally than any other school subject, opens the way to this study of industrial and social conditions. Its province is to show the relations between geographic conditions on the one hand and the life of man on the other.

The study of food, clothing, and shelter should be centered in the pupil's immediate surroundings. In tracing these commodities back to their origin, and in following the raw product through the various stages in its development, journeys will be made to the most distant lands. In this way much of the world will be covered, and always with a definite purpose in mind. The relation between the physical and the life conditions — real geography — will thus be logically and interestingly developed.

Maps should constantly be before the class for the location of cities, countries, and routes of travel. This feature has much more than a

present value, for it develops the very important habit of locating the geographic forms and the places studied in later life.

It would be unwise to attempt to give all of the many modifications of each industry. The experience of the teacher, and even that of some of the pupils, will furnish much material not here presented. To give information is important, but to *suggest*, and through suggestion to lead the pupil to discover for himself, are vastly more important. This point the author has kept constantly in mind. If this little book will help in opening the way to a comparatively new and a rich field in educational work, it will have fulfilled its mission.

The illustrations have been chosen with care. They have a teaching power not possessed by words. In order that the pupils may get the most from the pictures, the teacher must direct the study.

For illustrations furnished, thanks are due the following: *The World To-day;* Mr. H. E. Lodge, Colegrove, California; Illinois Central Railroad Company; Rev. C. B. Antisdale; Chicago Flexi-

ble Shaft Company; *Wool and Cotton Reporter*, Boston; Miss May Stone, Hindman, Kentucky; *The India Rubber World;* Mr. James Edinger, Stroudsburg, Pennsylvania; the Regal Shoe Company, Boston; the John B. Stetson Company; and the South Pasadena Ostrich Farm.

JAMES FRANKLIN CHAMBERLAIN.

CHICAGO, June, 1904.

CONTENTS

	PAGE
Introduction	3
Northern Neighbors	12
By the Dikes	21
The Land of the Queue	25
Island Dwellers	31
The Cotton Fields	39
On a Sheep Ranch	59
Woolen Cloth and Clothing	72
A Field of Flax	80
The Work of the Silkworm	85
Leather and its Uses	99
Where the Mackintosh grows	107
Furry Friends	129
A Summer with the Seals	147
A Spool of Thread	154
Needles	157
Pins	161
Sewing Machines	163
The Shoemaker's Story	167
How Hats are made	180

PAGE

A Pair of Gloves 192

What the Buttons told 197

The Laundry 204

Dyes and Dyeing 209

An Ostrich Farm 212

Gold 222

Diamonds 226

Pearls 230

HOW WE ARE CLOTHED

HOW WE ARE CLOTHED

INTRODUCTION

HAVE you ever watched cattle, sheep, or horses in a pasture, or fowl in a barnyard? What a large part of their time they spend in searching for food and in eating it. This is even more true of wild, than of domestic, animals.

If you go into the woods in autumn when nuts and leaves are falling, and sit quietly for a time, you may see some of the busy workers. Squirrels appear on the branches in the tree-tops. With their tails over their backs they frisk this way and that. They go out to the ends of the branches for nuts or gather them among the leaves on the ground. Then, carrying the treasures in their mouths, they hurry to their homes with the precious loads. Hour after hour they work if not disturbed. They

are gathering their supply of food for the long, cold winter.

People who are *savage* or only partly civilized spend much of *their* time in procuring food. When hungry they go in search of it. Sometimes they feast; sometimes they do not have enough to eat. When game is scarce, or when fruits and nuts are not plentiful in one place, they move to another. This is one reason why such people do not have homes in which they live all of the time.

We raise plants and animals for food and therefore do not have to search in forest and field when we want it. If crops are poor in one place, food is sent in from other places. Because of ways in which civilized people preserve their food, they can carry it with them when they travel in places where none can be obtained.

As you know, there are many people who do not produce their own food. This is always true in cities. Why? The farmer raises wheat, corn, oats, and potatoes for them. Gardeners furnish fruits and vegetables. Dairymen supply

milk, butter, and cheese. Meat is produced on the western plains. The fisherman braves the storms of the ocean in order to provide fish. Such a dinner as you have on your table every day may come from many parts of the world.

Even after food has been brought to the home, much work is necessary in order to cook and serve it three times each day. Therefore even *civilized* people spend considerable time in securing and preparing food and in eating. This is because *food is the first necessity of life.*

Next in importance after *food* comes *clothing.* In the colder parts of the world much is required, while in the hot countries but little is needed. All civilized people are clothed. Man must supply himself with clothing; but God has clothed the animals.

Have you ever examined the dress of animals? It is often very beautiful and is always useful. Here is a humming bird. Its little body is dressed in a delicate costume of various colors. How it glistens in the sunshine as the tiny creature darts swiftly from flower to flower!

How different the dress of this fish! The humming bird's suit would not do for it at all. Again, the polar bear is protected by a thick, warm coat of fur. Because it is white his enemies cannot easily see him when he is surrounded by the snow and ice of his home. Animals are dressed according to their needs. These depend partly on the climate and partly on the nature of their surroundings.

When warm weather comes, *we* put on lighter clothing. What do you suppose animals do? Some *migrate*, that is move to cooler regions, and some *shed* part of their winter coats. Name some animals that migrate. Have you ever seen an animal shedding its coat?

You have noticed that there is a great difference in the dress of animals. There is much difference also in the dress of people. An Eskimo, a Persian, and an American have very different costumes. Climate, as well as the taste and the religion of people, has much to do with their style of dress. No matter how people may dress, do not forget this: *man gets practically all of his clothing from plants and animals.*

Long ago people used clothing as they use it now, not simply to keep their bodies warm, but for ornament as well. Those whose homes were in hot lands wore light garments made of grasses, bark, and feathers. Those who lived in cold countries wore skins and furs. In time some learned how to make cloth of different kinds. They discovered also how to color, or *dye*, their clothing.

The dress of people in the past did not consist of so many pieces as it does to-day. Cloths and skins were often wrapped about the body in the form of a *robe*. In some parts of the world robes are still worn.

Before needles and thread were used, clothing had to be very simple. The first needles were not small, sharp, and bright, neither were they put up in packages as ours are. They were made of the slightly sharpened bones of fishes and birds. For thread, the sinews of animals were used. People did only "plain sewing" in those days.

When *you* need clothing, your parents often buy it "ready made." This is true whether

you live in the country or in the city. Suits, dresses, hats, gloves, shoes, stockings, every article needed, can be bought in the stores. When your grandfathers and grandmothers were children, most of the clothing of the people who lived in the country was made in the home.

Sheep were raised on the farms. The men washed and *sheared* them. The women straightened out the wool by means of *cards*. Every home had its *spinning wheel*, and as it flew round and round the yarn was made. This was then sent to some one in the neighborhood who had a *loom*. This machine wove the yarn into cloth. Clothing made in this way was called *home spun*.

In those days a country boy could stroke the heads of the very sheep that furnished him with the material for his suit. I have worn stockings, mittens, and scarfs which were knit by my grandmother and mother.

Linen was used then as it is now. It is made from the *fiber* of a plant called *flax*. The farmers raised the flax, and made their own linen

cloth. From this the women of their families made sheets, towels, napkins, and articles of clothing. Silk and cotton also have been used for a long time.

When people did all this work in the home, there was little time for other things. Newspapers, magazines, and books were not found in every family as they are to-day. People did not belong to clubs and societies as they do now. Children went to school but a few months each year, for they had to work in the fields and in the house.

About one half of the people of the United States now live in cities. Of course, these people cannot raise sheep, flax, or cotton. Some one must supply them with clothing. Even the country people seldom make their own clothing now. Nearly all of the cloth and much of the clothing used in the city and country is made in great factories by machinery. It is much cheaper to make it in this way than by hand. Why?

You remember that the work of securing and preparing food is divided. The work of

furnishing mankind with clothing is also divided. In this way all parts of the work are better done, and each person has more time for rest and improvement.

This shows you that many persons in different parts of the world are working to supply us with the things that we use daily. Perhaps as many as forty different persons have helped to make the pair of shoes that you are wearing. Many workers are needed to produce a dress, a hat, or a pair of gloves.

I am sure that you want to learn all you can about the materials from which your clothing is made. You want to know where they come from, and how they are prepared. In order to learn this, we must, in imagination, visit many parts of our country and many other countries as well. We shall see many interesting things, and become somewhat acquainted with the people who are working for us daily.

You do not want others to work for you unless you do something in return. There is work for each one to do. What you learn day by day will help you to do your part well.

Your opportunities to learn, to enjoy, and to do, are much greater than were those of your fathers and mothers. This is because they and many others have worked to make your lives happier and better. The only way to pay for what others have done and are doing for you, is to do your best every day and every hour.

NORTHERN NEIGHBORS

You know that the people who live about you dress in somewhat different fashions. You know also that the styles change from year to year, and that the nature of our clothing differs at different seasons.

Let us pay a visit to a few of our more distant neighbors and see how *they* are clothed. Some live in regions of snow and ice. Others live in lands where the frost king never goes. Some live where the "music of the pines" is always heard. Many have built their homes beneath the feathery branches of the cocoanut palm. The blue waters of the Pacific stretch in every direction. The never resting waves lap gently upon the sands, or thunder against the shore when a storm sweeps the ocean.

Occasionally a white-winged messenger comes from across the waters. At first it is but a speck against the sky. It seems to rise and

rise until all parts of a beautiful ship are seen. Do you know why it is not all seen at first? Most of the island dwellers do not.

Do you expect to find these neighbors of ours dressed alike, and dressed as we are?

Far to the northward there are lands where it is always cold. For many days during the long winter the sun does not appear above the horizon. At certain times during the summer it never disappears, and can be seen at midnight! No woods, nor fields of ripening grain, nor green meadows are to be found.

In this far northland lives the Eskimo. In his winter suit he looks a little like the animals whose skins and furs he wears. Until the white man visited him, these were the only kinds of clothing to be obtained.

Perhaps you have seen the great white bears in "The Zoo," or at the circus. Their home is in Eskimo land. Here also live the Arctic fox, the reindeer, the walrus, and the seal. I must not forget the faithful dogs. Without these the Eskimo would find it much harder

to live. The animals that I have mentioned. and even birds and fishes, furnish our friends with clothing.

Let us enter this house, or *igloo*, as the winter home is called. You need not look for a door bell. We will shout, and that will tell our friends that we have come to make a call. The house, you see, is of snow and ice. In some places earth, stones, and a few pieces of timber are used.

And now as we walk in you are surprised indeed. At first you cannot tell the men from the women. Are the children boys or girls? They wear jackets of reindeer skin, to which a hood of the same material is fastened. The edge of the hood is bound with dogskin on which the hair has been left. The wrists are bound with the same kind of fur. Of course the hood is not worn in the house. Indoors it is simply pushed back from the head.

Look! There is an Eskimo wearing a very large hood. Peeping from one corner of it I see a pair of small, black eyes, and the round face of a dear little baby! This is the only

Fig. 1. — Eskimo Mother and Baby.

cradle the Eskimo baby has, and the mothers always wear large hoods for this purpose

Both men and women wear trousers, some of reindeer skin and some of sealskin. They

wear boots of sealskin. Those of the women are longer than those of the men. Sometimes the boots are trimmed with birdskin and dyed bright colors. Women wear their trousers tucked in their boots, but the men's trousers are worn outside of the boots.

Courtesy of *World To-day*.

FIG. 2. — Eskimo Group, Whale River.

Underneath these heavy boots are lighter ones. We might call them stockings, for they are the only stockings the Eskimos have. They are often made of foxskin with the fur inside.

Even in Eskimo land it sometimes rains, and our friends have a way of keeping their suits

Fig. 3.—Polar Bear and Seal.

dry. *Their* mackintoshes are made of the intestines of fishes.

During the coldest weather, the Eskimo wears two suits of clothes. The father must be out of doors a good deal, in order to secure food for his family. He harnesses his dogs to his *sledge*, and they draw him swiftly over the snow. He may find a shaggy polar bear or a seal and kill it. Then there will be a feast. How they enjoy drinking the oil!

Many Eskimos live in Greenland. Locate this country on the map. That is a queer name to give to a country that is nearly all *white* instead of green. Others live on the islands to the west of Greenland and some on the mainland.

In the southwestern part of Greenland some white people live. Here the Eskimos wear garments of cloth over their fur clothing. These garments and many other things they get from the white man.

Ornament is not so common on the dress of these people as it is with us. In a land such as theirs clothing must be plain and useful.

If we had time, we would stay and become better acquainted with these people. As our friends live so far apart, our visits must be short. We seat ourselves on the sledge and tuck the reindeer skins about us. The driver cracks his long whip, and as the dogs start we bid good-by to our neighbors of the North.

BY THE DIKES

FRITZ is a Holland country boy. His home is not far from the North Sea. In the summer he wanders through beautiful green meadows where gentle cows are feeding. Often he sits on the green banks of the canals, and watches the passing boats and their images reflected in the water.

You know that in *our* country fields and farms are separated by fences; but in Holland they are often separated by canals. These canals drain the land and serve the purpose of roads. Great quantities of farm products are sent to the cities on boats.

It is in winter that Fritz and his sister Gretchen enjoy the canals most. Can you guess why? Then boys and girls, men and women, glide on bright skates over the frozen surfaces. What pleasure it is! The skaters' eyes are bright and their cheeks are red. Children go to school on skates; they go to the village or city

in this way; and people even go visiting on skates. You see the canals are lines of travel in winter as well as in summer.

In every direction windmills raise themselves against the sky. How patiently they seem to swing their long arms round and round! See whether you can find out what they are for.

When Fritz goes to the seashore, he finds a great wall of rocks, timber, and earth, called a *dike*, which shuts out the waves. Night and day they beat against it. Were it not for the dikes, they would sweep in and cover much of the land, for Holland is very low and flat.

Fritz's hair is flaxen. He wears a black cap with a shiny visor and a blue blouse with a row of large buttons in front. His trousers look much too large for him, and below them you see thick, black, woolen stockings.

But you are most interested in his shoes. How different they are from yours! Instead of being made of leather, they are made of wood. They are called *clamps* or *pattens*. They look quite clumsy to you, but Fritz and many other Holland children are quite satisfied with them.

In many of the towns the children wear shoes of leather.

Gretchen is in the house helping her mother. Her pattens stand just outside the door, for the

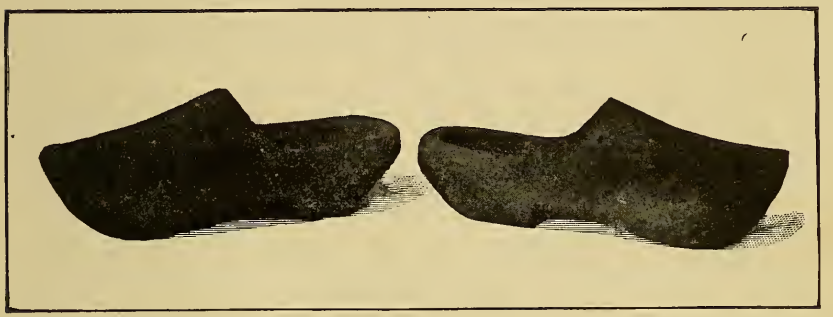


Fig. 4. — Holland Shoes.

shoes are not worn in the house. She, too, wears warm black stockings of wool. Over her black skirt she wears a white apron, while a queer little shawl is folded across her shoulders. Her hair is hidden by a prim cap of white. This is tied under her chin.

The women of Holland often wear more than one cap at the same time. Over a white one, edged with fine lace, a black one is worn. Large pins of gold and silver are sometimes fastened to the sides of the bonnet. A broad ribbon is tied in a bow under the chin.

Although Holland is a small country, the style of dress differs in different parts.

The broad waistband or sash is made by winding a narrow black band round and round the waist. To this band a pin cushion, a pair of scissors, and a needle case may be fastened by means of a silver chain.

From their own flax and wool the people make much of their clothing. The spinning wheel is a common household article, and the women often have gatherings or parties at which they spin and chat.

In some sections men go from house to house with small *looms*, and weave the cloth. They are very proud of the fine linen which they make.

But we must now leave this land of dikes and windmills, of canals and quaint costumes, and visit another part of the world.

THE LAND OF THE QUEUE

On the western shore of the Pacific Ocean live our Chinese neighbors. Here they have lived for a long, long time. They belong to the Yellow, or Mongolian, race. What other races are there?

The Chinese are very numerous. They live so close together that many parts of the country seem like great villages. So crowded are the people that many live on boats fastened to the banks of the rivers.

In order to visit China we must get on board a ship at some *seaport*. We shall sail for days before we anchor in the harbor at Shanghai. This city looks very different from those that you have seen. Most of the buildings are low, and they contain little furniture. The streets are very narrow and dirty.

Workmen here receive very low wages. Can you tell why? Many get no more than ten cents a day.

See! There is a man riding in a wheelbarrow. You might call these the street cars of China, for many men make a living carrying passengers in them.

There are very many things in China that you will think odd. The dress of the people is one. You will be surprised to learn that the Chinese think *your* clothing equally curious.

Like the Eskimos, the men and women in China dress very much alike. You notice that they all wear the hair long. The long, black braid that hangs down each man's back is called a *queue.* The women, you see, wear the hair coiled up. They spend much time in dressing it, and it usually presents a very sleek appearance.

Every one is dressed in loose-fitting garments, for the Chinese do not believe in wearing clothes that fit the body closely. Men and women, girls and boys, wear wide trousers. These end at the ankles. Here they are often tied.

Both men and women wear an outer garment, or *tunic.* The men's tunic comes below the waist. That of the women is longer. This is

made sometimes of cotton and sometimes of silk. Underneath this is an inner tunic. How loose the sleeves are! There is a woman using

Fig. 5. — A Group of Chinese.

them as mittens. They are at times used as pockets, also. I wonder what the Chinese boys do with their playthings, for you never see a pocket in their clothing.

See how odd the shoes are. They are quite low and have a sole of wood or leather. To this outer sole felt is fastened. The uppers are of cloth, often colored and decorated. No, the heels have not been lost. These shoes were made without heels.

Fig. 6. — Chinese Women. Notice the feet of the one on the right.

How strange it seems to see so few women on the streets of the city! They do not go out as much as the women in our country do. Some of those that we see have very small feet. They almost totter when they walk.

The Chinese think it a disgrace for women of the higher classes to wear large shoes. For ages they have had the cruel custom of binding the little girls' feet to prevent their growth. Because their feet are deformed, and because

their shoes are narrow on the bottom, it is hard for them to walk. I always pity them when I see them shuffling along. In some parts of the country the custom of binding the feet has been given up. Are you not glad?

Do the women have no hats? you ask. They are generally without hats. A parasol often takes the place of a hat. Sometimes a fan is held so as to keep off the sunshine.

Many of the workmen wear broad, cheap hats of straw. See those round hats of silk without rims. Fastened to the top of each one is a button. Some of these buttons tell just what rank the wearer holds. How do we tell the rank of the soldiers and policemen in our country? The priests and officials wear long robes over the ordinary garments. Sometimes these robes are lined with very expensive fur.

Very much silk is produced in China. Most of the people of that land, however, are too poor to wear silk garments. They dress in cotton clothing.

Some of the children are dressed in bright colors. Let us observe this little fellow. His

shiny silk cap has a red button on it. His queue hangs down his back. He wears a tunic of pink, fastened with a black cord. Below this are blue trousers and stockings of white. The funny little shoes are worked in red and green. How would you like to wear his suit?

In our country much of the clothing is made in great factories by machinery. In China nearly all of it is made by hand.

Here the styles change frequently. In China they change but little. The people seem to have found the style of clothing that suits them. How many of you will be willing to wear the garments of your parents when you are grown? The best articles of clothing are worn in China for two or three generations. No one feels that they are out of style.

From the land of silk, tea, and rice, we must sail away. We shall always remember our visit, and when we see a native of the "Celestial Kingdom" in our own country, we shall feel better acquainted with him.

ISLAND DWELLERS

As the coast of China fades from sight we sail southward. Now the days get warmer and warmer. At noon the sun is always nearly overhead, for we are in the *torrid zone.* At last, hundreds of miles south of the equator, we find the Samoan Islands.

There are some mountains upon them, but even from a distance we see that the land is clothed in green from shore to summit.

All along the shores are cocoanut palms. They toss their great feathery leaves in the ocean breeze. There are many other kinds of palms, also. No need to go to a store for bananas. Standing beside almost every home are trees loaded with bunches of the fruit. Breadfruit trees, bearing their precious loads, grow everywhere.

What queer houses these are! They are circular or oval in shape, and look a little

like haystacks. Several posts support the roof, which is the most important part of the house. See the shingles. They are the leaves of the sugar cane. When the roofs are well made they do not leak, although there is much rain here.

The brown-skinned island dwellers meet us with smiling faces and the word "Talofa." This means "a loving greeting." In this country they pay little attention to clothing, for it is always warm.

At the first glance it seems that the men are wearing mottled, tight-fitting trousers, bluish black in color. We are mistaken. Most of them wear no trousers. The limbs and the lower part of the body are closely *tattooed.* The tattooing is done by pricking through the skin with a sharp-pointed bone which has been dipped in coloring matter. Sometimes the girls and women have their names on their arms. Is not that a strange custom? The tattooing is done for the sake of ornament.

The chief garment of these people is called a *lava-lava.* It is a piece of cloth twisted about

FIG. 7.—A Samoan Village.

the waist and reaching to the knees. The lava-lava is dyed different colors.

Some of the men wear jackets of white. There are some women wearing garments looking like large bibs. Each garment is made of a single piece of bright calico in which a hole has been cut for the head. The use of calico has been introduced by the white people.

The girls are very fond of flowers. Bright red blossoms are often worn in the hair. Sometimes they wear wreaths of flowers about their heads and shoulders. Many wear necklaces of beads, also.

The clothing of our friends is, you see, very simple. How different it is from that of the Eskimo!

The Samoans do not make real cloth. Instead they make a material that is more like paper. It is called *tapa*. Tapa comes from the inner bark of the paper mulberry tree. This bark is pounded into long strips which are *pasted* together. From this material, which is very soft, they make their native garments.

Before we depart we are given a dinner in the "large house" of the village. There is no table to be seen, and stranger yet, there are no chairs. We seat ourselves upon the ground, and cross our legs. The food is served on large leaves, and we drink from cocoanut shells.

As our ship sails away the people stand upon the shore and wave their farewells; but long after they have disappeared we see the graceful cocoanut palms sending *their* message across the waves.

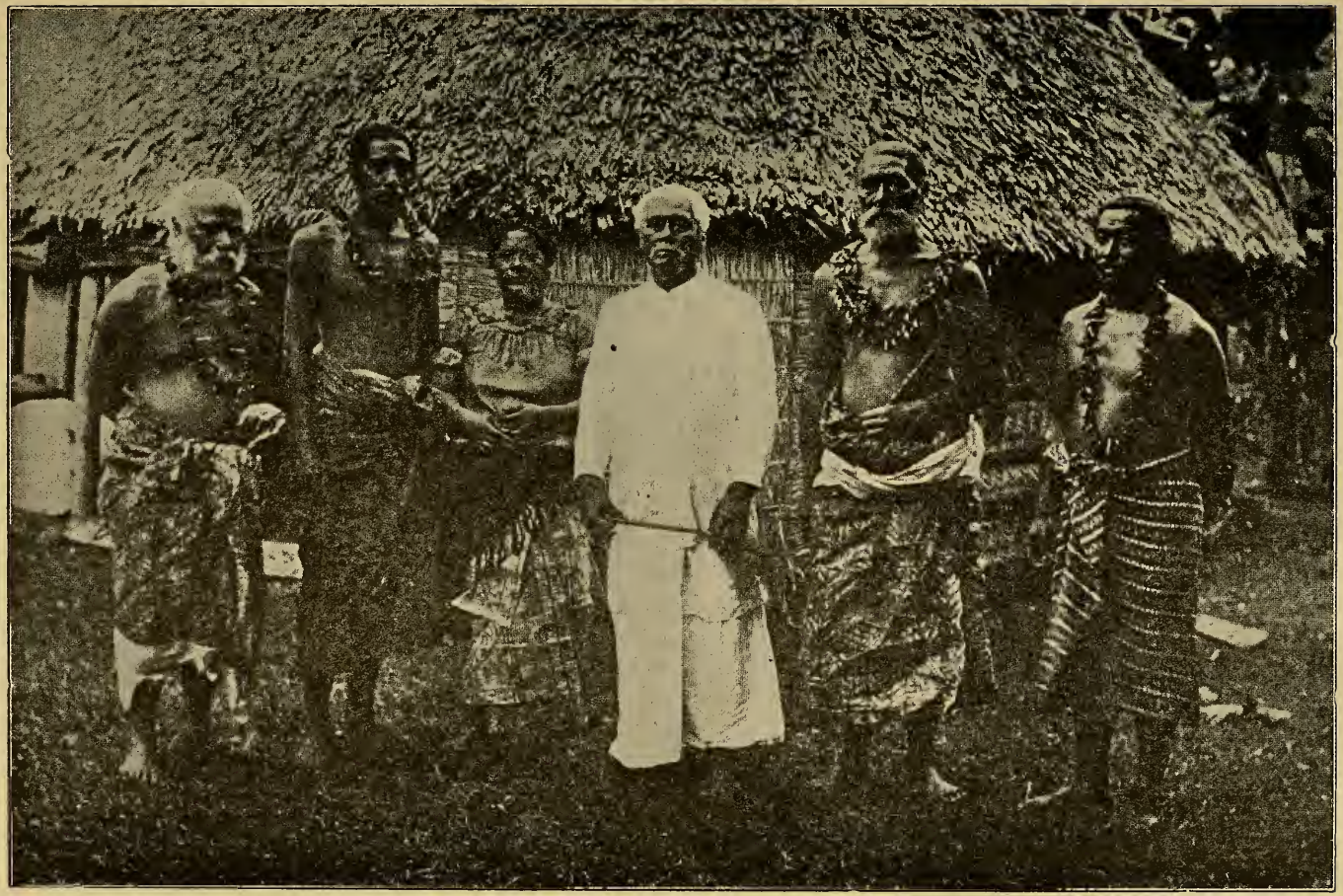


Fig. 8. — Samoan King and Chiefs.

THE COTTON FIELDS

IT was evening and grandpa sat in his easy-chair before the bright grate fire. How the yellow and crimson flames darted this way and that! How they wrapped themselves about one another and then danced up the chimney! The wood snapped and crackled, and now and then a piece broke with a sigh and rolled over, sending a shower of tiny sparks into the blackness of the chimney. There was no light in the room but that of the fire, and in the farther corners there were shadows of uncertain shapes. These were never still, and never twice the same.

This was the favorite time for story telling, and grandpa seemed to see many wonderful pictures as he watched the twisting flames and the shifting shadows. He was not surprised when May climbed up into his lap and asked for a story. Charlie drew his chair up close, and both prepared to listen.

Why is it that grandpas and grandmas know so many good stories?

"Once upon a time," began grandpa, "in one of the Southern States, a farmer planted some seeds almost as large as kernels of corn. He planted them in straight rows in much the same way as we plant corn in this part of the country.

"In about two weeks little plants appeared in answer to the call of the warm sunshine and the rain. The *planter*, for that is the name generally given to a farmer in the South, had his workmen hoe and plow them all through the long summer.

"You should have seen this field in September. It was a beautiful sight! In that southland of summer the children know little about snow. It seemed as though the fairies must have pitied them, for the plants had blossomed into what looked like the softest of snowballs! They were as thick as roses on a rose bush."

"It must have looked like our snowball bush when it is in blossom," said May.

FIG. 9. —Picking Cotton.

"A little," replied grandpa; "but you must remember that the field of which I am telling you was very large, and the plants were close together. When ripe, the capsules, or pods, containing the cotton, burst open, displaying balls of fluffy white fibers."

Taking a book from the mantel, grandpa opened it and showed the children a picture very much like the one found here.

"Isn't that a cotton field?" asked Charlie.

"Yes," replied grandpa, "that is a picture of a cotton plantation. When I have finished my story, you will know how useful the cotton plant is. More clothing is made from it than from anything else.

"The cotton shown in this picture is called *upland* cotton."

"Are there other kinds of cotton?" inquired Charlie.

"There is a kind called *sea-island* cotton. You can easily guess where *it* grows. It seems to need the atmosphere of the ocean. Can you tell me the name of a tree that loves the ocean?"

"The cocoanut tree," cried both children.

"These balls of white," continued grandpa, "are called *bolls*. They are made up of fine, short threads called *fiber*. Wrapped in the fiber are the seeds. This delicate fiber is the only part of the cotton plant used in making clothing. In sea-island cotton the fiber is a little longer than that in upland cotton. Even *long* fiber is less than two inches in length."

"Are there more than two kinds of cotton, grandpa?" asked May.

"There are many kinds; but the upland and the sea-island are the only important ones in our country. In India there is a kind called *tree-cotton*. As the name tells you it grows on a tree, the height of which is about twenty feet. Long ago there were some very wonderful stories told about the cotton tree. It was believed by some that as the buds of the tree opened they became tiny white lambs. The wool of these lambs was very soft and beautiful, and was used in making garments. Of course such stories are not believed to-day, for very many people have seen the cotton tree."

"Is it too cold to raise cotton here?" asked Charlie.

"Yes," answered grandpa, "the cotton plant needs a warm climate and much rainfall. That is why it is grown in the Southern States.

"The cotton-belt extends along the coast from Virginia to Texas, but Texas produces more cotton than any other state in the Union. Georgia, Alabama, and South Carolina rank next in importance. Russia, India, Egypt, and Brazil produce great quantities of this valuable fiber. What part of Russia will not produce cotton? Why?

"Our own country produces about three fourths of all of the cotton raised in the world. You see what an immense advantage this is to us, for we sell great quantities every year to other countries.

"A large cotton plantation is an interesting and a busy place. The planter's home is usually surrounded by beautiful grounds. There are wide lawns, beautiful flowers, and magnificent trees, some of which will not grow in the Northern States. Can you name any of these?

"On a large plantation there are generally a number of small houses called *cabins*. In these the laborers who work for the planter live. When the cotton fields are ready for the pickers, men, women, and children may be seen at work. Up and down the rows they go, pulling the fluffy masses from the pods, and putting them into baskets. Not all of the cotton is ready to be picked at the same time; and so the pickers must go over the field more than once."

"What do they do with the cotton after it has been picked?" asked Charlie.

"You remember that there are seeds within the bolls. The cotton must be separated from the seeds before the fiber can be spun. Long ago, before there was a machine for the purpose, people had to do this work by hand. It was very slow work, you may be sure. A pound of cotton was about as much as a person could handle in a day. To do the work in this way was, of course, very expensive, because so much help was required.

"A little more than one hundred years ago,

FIG. 10. — Hauling Cotton to the Gin.

a young man by the name of Eli Whitney concluded that he could make a machine that would separate the cotton fiber from the seeds. He studied earnestly, and finally invented a machine called the *cotton gin*. This machine would do as much work in a day as could be done by a great many persons working in the old way. The whole world has been benefited by what this young man did.

"Of course the planter cannot change his cotton into cloth. For this purpose it is sent to cotton mills. As you can see, it would not be very convenient to handle it in the loose form in which it is when picked. So it is *pressed* or *baled*."

"Why," said May, "that is what papa does with his hay before he ships it."

"Bales of cotton," continued grandpa, "are generally much heavier than bales of hay. Bands of iron are placed around them, and they are covered with coarse cloth. On the wharves at New Orleans, Galveston, Mobile, and other cities one may see thousands of these bales. Men place them on board great ships,

and they are taken to the Northern States and to Europe.

"When the cotton reaches the mill, it is torn apart by machinery and the dirt is removed It is then *carded* in order to straighten out the fiber."

"Grandma used to card wool," said May. "I have seen the cards."

"Now the carding is done by machinery," answered grandpa.

"Look at this bit of cotton cloth. You see that it is made up of threads which run lengthwise and crosswise. Drawing out the fiber and twisting it into thread is called *spinning*. Women used to do this work on the *spinning wheel*. With it they could spin but one thread at a time. Some of the machines used to-day spin two thousand threads at a time.

"Putting the lengthwise and crosswise threads together so as to form cloth is *weaving*. The machine that does the work is called a *loom*.

"The threads that are to run lengthwise are called the *warp* threads. These are arranged in parallel lines. *Shuttles*, run by machinery,

FIG. 11. — A Native of the Congo Basin Weaving.

are carried back and forth between these, weaving in the *woof*, or crosswise threads."

"Is cotton cloth always white?" inquired Charlie.

"No," replied grandpa, "it is of different colors. Sometimes there are several colors in the same piece of cloth. The threads may be dyed before the cloth is woven, or the colors may be stamped upon the cloth. Great rollers are used for this purpose. Only one color or pattern is stamped at a time.

"Muslins, ginghams, cambrics, calicoes, sheetings, towels, laces, embroideries, and cotton batting are some of the things made of cotton. Calico was first made in a city of far-away India, called Calicut."

"I know something else for which cotton is used," said May. "I have often seen on spools of thread the words 'spool cotton,' and now I know what they mean."

"I don't see how people ever thought of twisting the short fibers of the cotton plant into thread, and then weaving it into cloth," said Charlie.

"It is wonderful," replied grandpa. "But the people of India, Egypt, and China knew how to do this work hundreds of years before Christ was born. When people really *need* a

FIG. 12. — Cotton ready to be Shipped.

thing, they keep thinking and studying until they get it.

"Soon after the people settled in our Southern States they began to raise cotton. For a long time it was raised in gardens as an ornamental plant. Probably the first cotton was shipped from our country in 1784. In that year eight bags were shipped from Charleston, South Carolina, to London. I have already told you that many ship loads are now sent from the South every year. The rich plantations of that section produce more cotton than all the rest of the world."

"Did the settlers send all of their cotton to England?" asked Charlie.

"They did for a little while," answered grandpa, "but in 1790 they built their first cotton mill at Pawtucket on Narragansett Bay There are many mills in this city and in the surrounding ones to-day. The United States still sends very much cotton to England, however."

"Are there cotton mills in the Cotton States?" inquired May.

"Yes," returned grandpa, "a great many Most of them are situated along the 'fall line,' and so they have the advantage of cheap power.

"Now," continued grandpa, "you see how people in different parts of the country are working to supply one another with the things in daily use. Much of our clothing is made of cotton: yet we cannot raise it here, for it is too cold. Without the people of the South who cultivate and pick it, without those who work in the mills, and those who handle the goods in the stores, it would not be so easy for us to get many articles of clothing."

Fig. 13. — Loading Ship with Cotton at New Orleans.

ON A SHEEP RANCH

Billings, Montana, July 27, 1915.

Dear Cousin Harold: A few days ago I returned from the sheep ranch where father and I have been staying for some time. Perhaps you would like to know something about the work of the *sheep men*. That is what the men who raise sheep in the West are called.

There are about twenty-five thousand acres in our ranch. Some ranches are very much larger than ours. We raise some alfalfa, but most of the land is used for pasturing the sheep. Besides this, the herders pasture on some of the government land. There are no fences around it, and the sheep can be driven for long distances.

During the winter, the sheep are kept on the lowlands. Most of the time they get their own living from the dry *bunch grass*. The snow usually gathers in drifts and does not cover

all of the grass. When it does, the sheep must be fed. Then the sheep and the cattle men are anxious for the "chinook" to blow. This is a warm, dry wind, which quickly removes the snow.

In the spring the sheep are divided into "bands." There are hundreds of sheep in one of these. Each herder has charge of a band, but his shepherd dog does most of the work. I wish that you might see some of the things that these dogs do, Harold. They obey each word and sign of the herders. They will even pick out a particular sheep when they are told to do so, and drive it in any direction.

The herder's life is very lonely. For a long time he may not see any one but the man who brings him a supply of food about once in two weeks. Much of the summer *range*, or pasture land, is on the mesas and mountains.

Of course you know that sheep are sheared every year. In some parts of the West they are sheared in the spring and again in the fall. The wool is not made into cloth here, but is shipped to the East. On this account

Fig. 14. — A Band of Sheep.

the sheep are sheared as near to the railroad as possible.

Sometimes bands are driven for hundreds of miles. The owners of these have no land of their own. They simply keep their flocks on government land. There is a law that prevents them from driving the sheep within two miles of a house. When a great band of sheep has passed through a region, there is no vegetation left. Because of this, there are many quarrels between the sheep men and the cattle men.

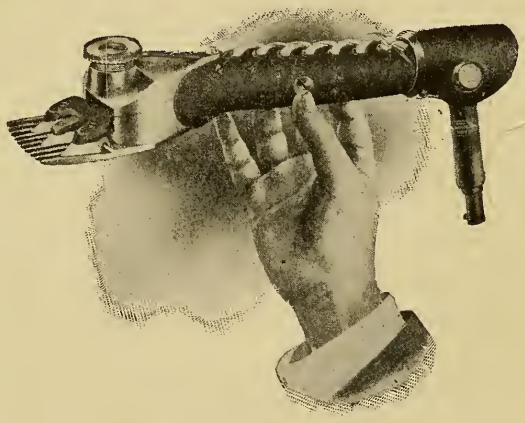


Fig. 15. — Clipper used in shearing Sheep.

Have you ever seen horses clipped by machinery, Harold? That is the way the sheep are sheared on our ranch. A fleece is taken off in a very short time. One man can shear from one hundred and fifty to two hundred sheep in a day. The wool is put into

sacks, and is hauled to the nearest railroad station. This is the second year that father has had the shearing done by machinery. He

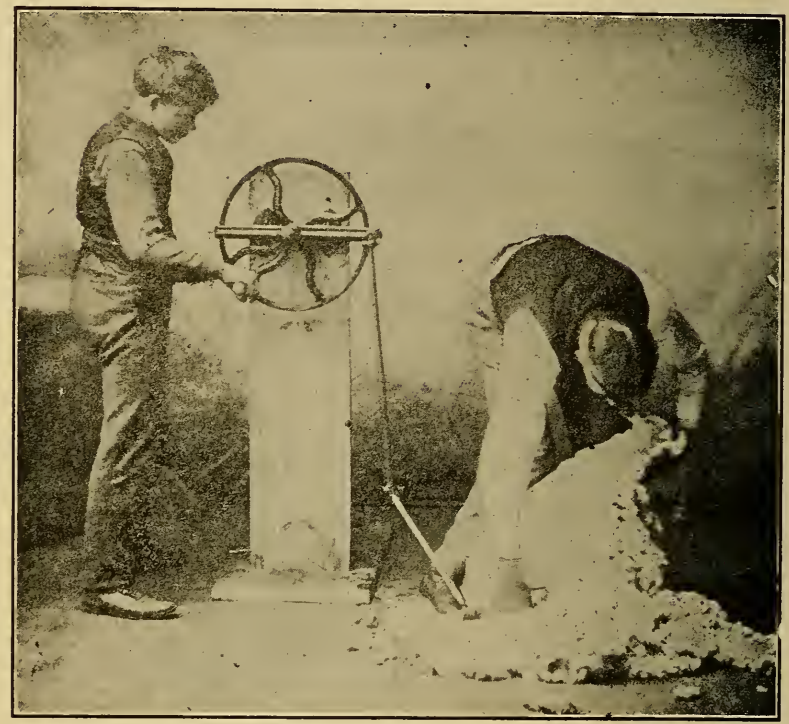


Fig. 16. — Shearing a Sheep by Machinery.

went to the ranch to oversee the work, and he let me go with him.

Many of the ranchers hire the companies of shearers who travel from place to place. When the men are ready to begin shearing, the sheep are driven into *corrals*, or yards. These cor-

FIG. 17.—A Company of Sheep Shearers.

rals are divided into small pens, and two men work in each. The men are so used to their work that they do it very rapidly.

The men have nearly finished hauling our wool to Billings, where it is loaded on the cars. Great quantities of wool come in there from all directions. It is carried in large wagons. Often two will be fastened together and drawn by eight teams.

When shearing time comes, the sheep are very dirty. They do not look much as the lambs do in the spring. The wool is oily, and so a great deal of dust and dirt sticks to it. Besides, it contains many burrs. All of these have to be removed.

I read the other day that in England the sheep are washed before the wool is cut. Father says that this is often done in the East. The sheep are taken to a clear stream or pond. The men carry them into the water, and wash the wool until it is quite white. In a few days the wool is dry enough to be cut.

In Montana, Idaho, New Mexico, Texas, California, and other western states this is not

done. There are so many sheep in a band that the washing would take a very long time In some parts of the sheep country there are few streams large enough for this purpose. Besides this, the wool can be washed more thoroughly after it has been clipped than before.

If you were to lift a fleece before it had been washed and then lift it afterward, you would notice a great difference in the weight. This is because of the dirt that has been taken out. A fleece weighs about one half as much after washing as before. You see it saves a great deal in freight to wash the wool before it is shipped. On this account much of it is washed in Billings, Great Falls, and other shipping centers.

I have never seen wool made into cloth Father says that some of the wool handled in the manufacturing cities of New England comes from Montana. So you see the sheep raisers of the West help to supply the people of the East with woolen clothing.

Besides the United States, Australia, New

Fig. 18.— Hauling Wool to the Railroad.

Zealand, South Africa, Spain, and Argentina are great sheep-raising countries.

Father told me that Columbus brought sheep to America in 1493, and that the "Mission Fathers" took sheep to California when they settled there.

I would like to know something about the manufacture of woolen goods. Have you ever visited any of the mills in Lawrence? If you have, please tell me about them when you write.

Your loving cousin,

CLIFFORD.

WOOLEN CLOTH AND CLOTHING

LAWRENCE, MASSACHUSETTS, Sept. 15, 1915.

DEAR COUSIN CLIFFORD: Ever since I received your letter I have been wishing that we could visit you. We have never lived in the country, and I know very little about it.

I enjoyed the letter very much, because we studied about clothing last year. Our teacher took us to one of the woolen mills in the city.

It would seem very strange to me to live in a country where the houses are so far apart as they are in Montana. Here the country is thickly settled and towns and cities are close together.

Papa says that Montana is eight times as large as Massachusetts, but has only about one eighth as many people.

If you will look at your map, Clifford, you will see that Lawrence is built on both sides of the Merrimac River. This is not a very large

river, but it is very useful. There are rapids here, and the water runs quite swiftly. Long ago people saw that the river would furnish water power for manufacturing, and so mills were built.

There are both cotton and woolen mills here. Some of the companies employ as many people as live in the city of Billings.

Many other cities in New England manufacture woolen goods. Providence and Lowell are important. Our teacher said that England and New England are much alike so far as the making of woolen goods is concerned.

When we visited the mills, we were first taken to the room where the wool is sorted. Next we saw the wool being cleaned. It was given a good pounding or beating which took out some of the dirt, and was then washed in lye. At the mill they called this *scouring*.

After taking out the burrs and sticks, the wool was put into a drum in which there were cylinders containing sharp teeth. These cylinders rotated very fast, and the tangled-up wool was torn into a fluffy mass.

In another room we found wool spread out on a stone floor. By means of machinery it was being sprinkled with olive oil. The teacher said this was to make it feel softer.

We next visited the *carding* machines. These are cylinders having many fine short teeth. The wool comes from the carding machines in layers called *laps*. These are wound on rollers. Carding used to be done by hand. I will send you a picture of old-fashioned *cards*.

Next we saw the wool *spun*, or twisted into yarn. Many threads were spun at once. You know that this work used to be done on a spinning wheel. That spun but one thread at a time.

The yarn is now *woven* into cloth. This is done by the *looms*. A set of threads called the *warp* threads is arranged in parallel lines, and another set of threads is rapidly woven in and out in the opposite direction. These are called the *woof* threads.

The cloth is not finished when it comes from the loom. It must then be washed and pressed; in this way it is made more compact.

Fig. 19. — Spinning Wool by Hand.

You know that there is a sort of fuzz on cloth. I saw how that is made. A great number of burrs, or *teasels* of the teasel plant, are fastened to rollers through which the cloth is run. The teasels are rough and pull out tiny threads. This work is called *teasing*.

We found that there are many different names given to woolen goods. I did not know

before that *broadcloth* is really broader than the other kinds.

We were told that old woolen rags are torn up and made into a cloth called *shoddy*. Clothing made of shoddy is warm and cheap. To be

FIG. 20.—Spinning as done in Palestine and Other Parts of Turkey in Europe.

able to obtain warm clothing at a small cost is a great advantage for poor people.

Woolen cloth is made into men's suits, dresses, cloaks, overcoats, underclothes, stockings, gloves, hats, blankets, and other things.

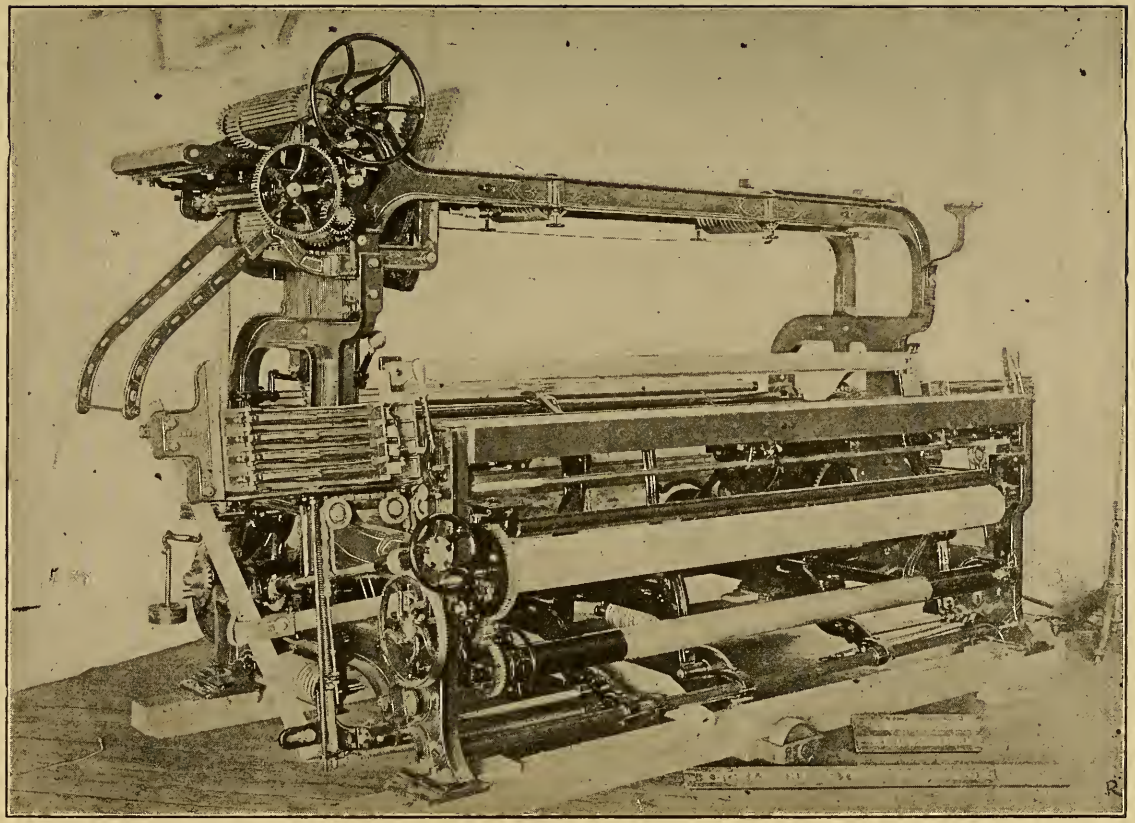


Fig. 21. — Woolen Loom.

Our teacher told us that a great deal of clothing is made by women who do the work in their homes. The garments are cut out in the factories and tailor shops, and the sewing is done by these women.

I suppose that some of the clothing made in the New England towns is shipped to Montana and other western states. How strange it seems to produce the wool there, send it here to be made into clothing, and then send some of the garments there to be worn! It shows that the people in one part of the country need the help of those in another.

Good-by, Clifford. Don't forget to write to me often. I send my love to all.

Your cousin,

HAROLD.

A FIELD OF FLAX

One of the plants very useful to man in making clothing is *flax*. You have seen a picture of a cotton field. A field of flax is quite different in appearance. The stalks are tall and slender and are easily stirred by the breezes. When the flowers appear, a mass of small blue blossoms may be seen. These rise and fall like the waves as the wind passes over the field.

Extending up and down within the flax stalks are long, strong fibers. These are bound together by a sort of gummy substance. From these fibers are made linen dresses, waists, shirts, collars, cuffs, handkerchiefs laces, thread, and many other things.

Cotton, you remember, is raised only in warm countries. Flax is grown in the cooler parts of the world. In Persia it grows wild. In our own country flax is raised almost en-

tirely for its seed, from which linseed oil is made. You see you are indebted to some foreign countries for your garments of linen.

If you were in Belfast, Ireland, or in the country surrounding it, you would see many of the people in city and country making linen. In some homes the old-fashioned spinning wheel is yet used. When you are in a dry-goods store, see whether any of the linen goods are marked "Irish Linen." In Holland, Belgium, France, and southern Russia, great quantities of flax are raised. Look at your map and see where all of these countries are.

Many years ago flax was found in most of the gardens and fields of our own country. The farmers' wives spun it and wove it into cloth. In some of the towns, schools were established in which the girls were taught to do this work.

The autumn is the time of the flax harvest. How do you suppose the flax is gathered? It is not picked as cotton is, neither is it cut. The farmers *pull* it, a handful at a time. Of course it takes a long time to pull all of the

flax in a field. A great deal of dirt clings to the roots. This the workers remove by striking the flax against their boots. Why would it not do to cut flax as grain is cut?

In order to remove the long threads, or fibers, from the stalks, the substance which holds them together must decay or soften. This result is brought about by spreading the flax on the ground, where it remains for about two weeks. The dew wets it at night and the sunshine dries it during the day. The process is called *retting*.

In some places tanks have been built. These are filled with water, and the flax is retted in them. In this way the retting is accomplished in a shorter time.

In Belgium great quantities of flax are piled upon the banks of some of the rivers. It is loaded on rafts, and these are then sunk. Coarse cloth is placed all around the flax. This allows the water to enter, but keeps out dirt. When the flax is retted, the rafts are hauled to the bank by means of windlasses. You have seen such machines used in moving houses.

After the flax dries, the next process is to separate the straw from the fiber. The stalks are pounded until the woody portion is well broken up. This is called *breaking* the flax.

Now a bundle of the flax is pushed through an opening near the top of an upright board or plank. A broad, wooden knife moves up and down against the plank. It chops the stalks as they come through. In this way the woody substance is removed, but the fiber is injured very little. Other kinds of machines are sometimes used, but they are for the same purpose. This work is called *scutching*.

Next we see the flax being drawn between the teeth of large iron combs. This process straightens out the twisted fibers, and removes broken ones. The broken ones are called *tow*. Tow is used in making poor qualities of cloth. Combing the flax is called *hackling*.

The fibers can now be spun into thread. I have told you that spinning used to be done on the spinning wheel. Finally the thread is woven into cloth.

What a wonderful thing it seems for a

family to raise the flax, prepare the fiber, weave the cloth, and cut and sew the garments! Just think of having a suit of clothes or a dress produced in this way! The way in which clothing is made to-day is still more wonderful, however.

I have told you how very long cotton has been in use. Linen has been in use very much longer. Thousands of years ago the people of Egypt used it. What wonderful river flows through Egypt? On some of the monuments of stone the people carved the flax and the ways of making it into cloth. History is not always written in books, you see.

So well was the linen cloth made in those olden times, that some of it still remains. Pieces that are believed to be nearly two thousand years old have been washed without injuring them.

THE WORK OF THE SILKWORM

THE morning sun is sending its first slanting rays into a beautiful valley in southeastern France. Every hill and tree casts a long shadow to the westward. Birds are chirping their morning greeting to friends and searching industriously for breakfast. How like diamonds the drops of dew glisten on grass and leaves! Smoke is rising above the houses of the farmers, showing that people, as well as animals, are astir. Let us walk down this country road and enjoy the scene.

On the hillsides we see the dark green of the vineyards. How I wish that we might be here in the autumn and search for the clusters of purple grapes beneath the broad leaves! That delicious perfume comes from the waxy orange blossoms in the orchard a little farther on. Do you wonder that the bees hover about them? There are many lemon orchards about here also.

On our right are rows of spreading trees having a gray-green foliage. These are olive trees. See how narrow the leaves are. No one would think of eating an olive from the tree, for the olives are very bitter before they have been prepared for use.

We may know by what we see about us that there is no cold weather here. Do you know of any part of *our* country where such things grow?

A garden gate opens, and little Susette and her mother come toward us, each carrying a basket. Susette is a peasant girl, with black eyes and hair. Mother and daughter smile and bow as they pass us, and soon enter a grove.

See! They are picking the leaves and putting them into the baskets. What are they going to do with them? Let us go with them to their home and perhaps we shall learn.

The house is small, but very neat. Trees and vines almost hide it, making it delightfully cool during the warm summer days. Over the front of the house a climbing rosebush has spread itself, and its blossoms appear on every part of the building.

Susette and her mother wash the leaves and dry them. They are then cut up into small pieces and carried into a light, quiet room, where everything is sweet and clean.

Now the dark-eyed peasant girl has a surprise for you, indeed. You peep into the trays standing one above another on shelves, and find that they contain a great number of tiny black worms! It is for these little creatures that the leaves have been gathered and prepared so carefully. What kind of leaves are they? Ask Susette. *She* is surprised this time, for she has never lived where *mulberry* trees do not grow.

Although we have never seen any before, we do not need to have our little friend tell us that the worms on the trays are *silkworms*. The grove of mulberry trees is to supply them with food. By a most wonderful process the worms are changing these leaves into silk. If it were not for the work of these little creatures, we could not have the beautiful silk dresses, ties, ribbons, and other things made of silk which we now enjoy.

"How small the worms are!" you say. "Yes,"

answers Susette. "They were hatched but yesterday. These others are a week old. You see how fast they grow."

Susette and her mother go about the room carefully spreading the leaves over the different trays. The worms do not wait for an invitation, but begin breakfast at once. If you listen closely, you will hear a low sound as they eat the leaves. See this fellow. He moves his head sidewise as he eats. When he has reached as far as he can without moving his body, he swings his head back to the place of beginning, and starts again. The leaf disappears quite rapidly.

Here are some worms that are not eating. "Are they sick?" we ask. Susette smiles. "These," she answers, "have grown so fast that they must have new suits, and so they are shedding their skins. They do this every five or six days as long as they live. While this is going on they do not eat."

Susette's mother beckons us to step to the other side of the room. Surely these are not silkworms! They are quite different from the

others. They are about two inches in length and as thick as a lead pencil. Besides, they are cream-white. Yes, they are simply full-grown silkworms; their lives are nearly ended, for they live but about a month. Although we always speak of these little workers as *worms*, they are really *caterpillars*.

The caterpillars at which we just looked will not need to be fed much longer. When they get restless and refuse to eat, they will be ready to begin spinning their *cocoons*. Then Susette and her mother will put little arches of twigs above them. The worms will climb up these and commence their work.

Until the worms are full grown they must be fed quite frequently. Sometimes they eat six meals in a day. They must not be neglected or they will not thrive. Those who tend them must see that their food and surroundings are kept perfectly clean.

In very many of the cottages of this part of France we shall find just what we have found in Susette's home. The work of caring for the worms is light and pleasant, so much of it is

done by women and children. The men work in the fields and factories. If we were to visit Italy, China, and Japan, we would find that in these countries, also, the raising of silkworms is a household industry.

The silk, of which the cocoons are spun, is carried in two little sacs, one extending along each side of the worm, and ending in a single opening in the head. So you see the silk comes out as a single thread. The little sacs are called *spinnerets*.

In the body of the worm the silk is in the form of a jelly, but it hardens when it comes in contact with the air. This fine silken thread the worm coils about its own body, thus making itself a prisoner. From two to five days are required to complete the cocoon.

All of the time that the worms are spinning there is a soft sound heard. When this ceases, the work is done.

Let us examine these cocoons. Most of them are white, but some are yellow and others are light green in color.

If these cocoons are kept warm enough for

two or three weeks, a moth will come from each. See! Here is the hole made in the end of a cocoon from which a moth was hatched.

FIG. 22. — Cocoons.

Susette now leads the way to a part of the room where some of the moths may be seen. They are about the color of cream, with brown bands upon their wings. You think of some of the moths that you have seen in the woods

and fields with beautiful colors on their wings. They fly about from place to place, and seem to enjoy the bright sunshine. These moths do not fly. If they did, they would not be of much use to man.

Besides the moths there are a great many eggs, each about as large as the head of a pin. Some

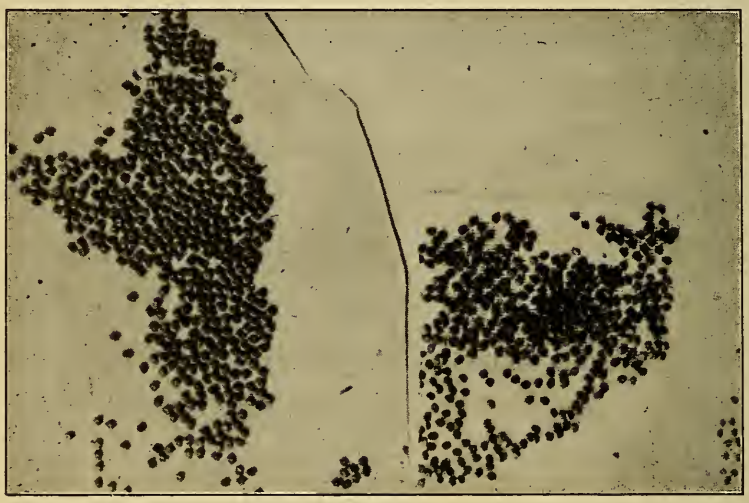


Fig. 23. — Eggs of the Silk Moth.

are white, some gray, and some yellow. In a few days after laying the eggs, the moths die. Susette's mother says that it takes from twenty to forty thousand of these eggs to weigh an ounce! Are there so many people as that in your town?

"You see," says Susette, "the worms which you first saw had but just hatched from eggs like these. In five or six days, if these eggs are kept warm enough, they, too, will hatch. Sometimes we put them into this incubator."

I wonder if she has ever heard of hatching chickens in an incubator.

The mulberry tree is not an evergreen, so the work of raising silkworms cannot go on all of the year. The eggs that are laid in the fall are not allowed to hatch then. Why? They are kept cold until the next spring.

When the moth breaks out of the cocoon, it spoils much of the silk. When silk is wanted, the *chrysalis* or germ from which the moth develops must be killed. This is often done by placing the cocoons in metal boxes and admitting steam. In Susette's home, and in many others, they are placed in the warm sunshine or in ovens.

Our friends have another pleasant surprise for us. They are going to show us how the silk is unwound from the cocoons.

The cocoons are first sorted and then placed

in warm water to dissolve the gummy substance that binds together the different parts of the thread. With a fine brush Susette carefully catches the ends of the threads from several cocoons. These she twists together, because a single thread is too fine to be made into cloth.

By means of a very simple *reel*, her mother winds the silk into a *skein*. This is called *raw silk*. In this form it is sold to the factories where silk goods are made. The money obtained in this way is of great help in supporting the family.

You remember that each cocoon is made up of a single thread. How long do you suppose these threads are? Susette shakes her head when we ask *her*. Her mother says several hundred feet! They are often as much as two blocks long!

We must bid good-by to our friends. We shall often think of them and of the vine-covered cottage in sunny France.

Far to the northward, on the bank of the river Rhone, is the city of Lyon. Here a great

deal of silk cloth is manufactured. We may go up the river by boat, or travel by train, for a railroad follows the course of the stream

For some distance we see on either side the groves of mulberry trees, and the orchards of orange, lemon, and olive trees. But now the country becomes rougher and higher. The soft breath of the blue Mediterranean is no longer able to keep back the frost king, and gradually these trees disappear.

At the silk mills it is very different from Susette's quiet home. Tall chimneys send out columns of black smoke. The work is done mainly by machinery, but there are many men, women, and children employed. The raw silk is wound on spools, and then the silk from two or more spools is twisted together. Threads called *warp* threads are then arranged in parallel lines, and other threads are woven crosswise. You remember that cotton cloth is woven in this way.

The threads, which the worms by such patient labor and wonderful skill produced, are now silk cloth. This cloth is taken to the packing

room, where dirt, stains, and knots are removed. It is then sprinkled, sponged, and run between rollers of steel; this treatment gives it a gloss. After this it is folded or wrapped on smooth, thin boards, and is ready to sell.

You have often seen flowers and other patterns on silk cloth. These are produced by engraved rollers, between which it is run. Sometimes it must pass between several sets of rollers, for each stamps but one color or design.

What a wonderful history the beautiful silk dresses and ribbons have! How different they look from the leaves of which they were made!

A large part of the raw silk is made into ribbon. Ribbon is worn on account of its beauty rather than because of its usefulness.

You know that much silk cloth is made in France. The same country is the most important in the manufacture of silk ribbon. Much of the work is done by girls. The largest ribbon factory in the world is in Paterson, New Jersey. Find the city on the map.

Although silk is so common to-day, there was a time when people did not know how to finish

the work which the silkworms begin. It is said that the secret was discovered by a Chinese empress twenty-seven hundred years before Christ was born. How long is it since the birth of Christ? The people of China have not forgotten the woman who made this valuable discovery, and every April they have ceremonies in her honor.

For a long, long time the Chinese guarded the secret of silk making. Why? A story says that many hundred years after they learned the secret, a princess carried to India eggs of the silkworm and seeds of the mulberry tree, concealed in her headdress. According to another story, some monks carried eggs in a hollow cane to the city of Constantinople. At any rate, the people of other countries finally learned to make silk.

When Virginia was settled, the people found it very profitable to raise tobacco. They even planted it in the streets of the towns. James I was very much opposed to the use of this weed, and he sent to the people eggs of the silkworm and mulberry trees, hoping that they would

give up raising tobacco. In this the king was disappointed.

Our country has never produced great quantities of raw silk, although we manufacture a great deal of silk cloth. We get much of the raw silk from China. What else do we get from that country? Japan, India, Italy, and France are also important in the production of silk. In all of these countries labor is very cheap, and much of the work is done by women and children. It is said that many Chinese families depend very largely upon the silk which they produce. In the factories the women get about twenty cents a day besides a little rice for food.

LEATHER AND ITS USES

The coats that are worn by cattle, sheep, and other animals are called *skins*. After these skins have been *tanned*, they are called *leather*.

Many articles of clothing are made of leather. Let us name some of them. Boots, shoes, coats, caps, aprons, belts, gloves, and mittens are the most important. Have you ever seen any one wearing an apron of leather?

Besides those of sheep and cattle, the skins of goats, deer, horses, dogs, kangaroos, alligators, and of some other animals are made into leather. Calfskin makes the best shoes for men and boys. Only the skin from the under side of an alligator's body can be used. Can you tell why?

A place where skins are tanned is called a *tannery*. An acid obtained from the bark of the oak, hemlock, and some other trees is much used in tanning. On this account tanneries are often found where these trees grow in abun-

dance. There are other things also that are used in tanning.

Let us visit a tannery and see how the work is done. Here are great quantities of skins or hides. Some of them have come from the cities where large numbers of animals are killed for food. Can you name any of these cities? Some come from Mexico and some from the plains of South America.

The hides are placed in large vats partly filled with a liquid containing lime. This liquid loosens the hair, which is afterward scraped off with a blunt instrument. The lime is now washed off by throwing the hides into the water. Here is another man scraping the skins. He is removing bits of flesh that were left clinging to them.

You have often noticed the *pores* in the skin on the back of your hand. The perspiration comes through the pores. There are pores in the skins of the lower animals, too. In order to open the pores of the skins, so that the tannic acid may enter and *tan* them, the skins are soaked in a certain liquid.

Fig. 24. — Removing the Hair from the Skins.

If you have ever had a blister on your hand, you have noticed that the skin consists of two layers. The skin of the lower animals consists of two layers also. The inner layer, or *derma*, is made up partly of a jellylike substance. Tanning hardens this and makes the leather wear well. If it were not for the tanning, shoes made of leather would not be very valuable, for they would soon wear out. After the skins have been dried, they are pressed between great rollers to make them smooth. A hundred years ago tanning hides required many months. Now it is done much more quickly.

Shoes and other things made of leather are of different colors. This is because the leather is colored. It is not *dyed* as cloth is, but the color is put on with a brush.

Kid gloves are made from the skins of young goats and lambs.

Leather has been used for a long, long time, as is the case with cotton and flax. We read in the Bible of a tanner by the name of Simon, who lived in the city of Joppa.

There were tanners among the first settlers in

New England. Not long ago when workmen were clearing the ground for a building near the Boston Post Office, they found vats that had been used by tanners in the early days.

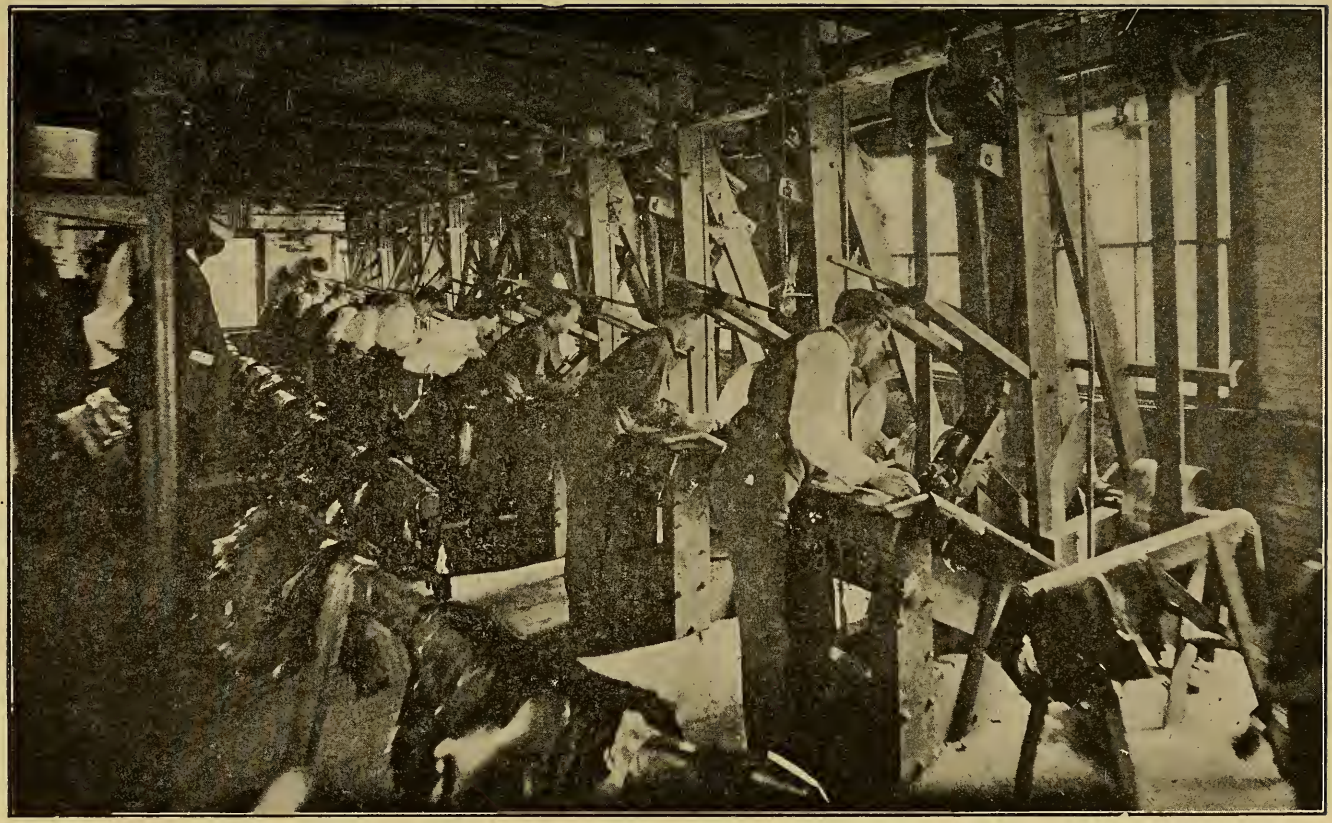


Fig. 25.— Glazing Skins.

WHERE THE MACKINTOSH GROWS

The rain had been falling steadily all the morning. The wind drove it angrily against the window panes, down which it ran in sheets. What a noise it made as it spouted from the gutters of the houses on to the pavement! The dull, gray clouds seemed to trail along the tops of the great office buildings, spilling their rain as they went. High above the office of the *Weather Bureau* hung a red flag with a black square in the center. This was to warn the captains of vessels that a great storm was likely to rage upon the ocean.

Ray was standing at the window, looking at the wet world without, when the bell rang. Opening the door, he saw a boy about his own age. He was dressed in rubber from the crown of his head to his feet.

The boy asked for Mr. Linnard, and when he came, handed him a yellow envelope and a small

book. Ray's father wrote his name in the book, the boy returned it to his pocket, and buttoning up his coat walked away.

You have guessed by this time that the envelope contained a telegram. It stated that Mr. Linnard was wanted on the rubber plantation in Brazil, in which he was interested. Soon Ray's father asked him to carry a message to the nearest telegraph office. It was directed to Para, Brazil.

When he returned, Mr. Linnard asked him whether he got wet.

"Oh, no!" returned Ray. "My new mackintosh kept out every bit of the rain."

"Ray," said his father, "how would you like to visit the country where mackintoshes grow?"

The boy looked at his father in surprise. "Where mackintoshes grow?" he replied.

"Yes," said Mr. Linnard, smiling. "Rubber clothing is made from the juice of the rubber tree. So if you visited a rubber plantation, you would be in the land where the mackintosh grows. I shall start for Brazil on Monday, and if you wish, you may go with me."

Ray was too delighted to talk. He had read of the great Amazon and the dark forests through which it flows, and he was now about to see for himself these wonderful sights.

FIG. 26. — Japanese Rain Coats.

He got his atlas and traced the course of a ship from New York to Para. "How long will it take to make the trip?" he asked.

"From two to three weeks," replied his father. "The message that I received this morning reached me within two hours after leaving South America.'

Of course there was much planning and packing for the coming journey. At last Monday morning came, and Ray and Mr. Linnard stood upon the deck of the *Sea Gull* as she slowly moved away from the wharf and swung out into New York harbor.

They pass the famous *Statue of Liberty*. They plow their way through *The Narrows*. Now they are opposite *Brighton Beach*, where the family has spent many a pleasant afternoon. Finally *Sandy Hook* with its lighthouse fades from sight.

Day after day there was the blue sky above and the blue water beneath. No houses, trees, hills, or meadows. Only that endless waste of water always rising and falling.

There was something to be learned all the time, however. Ray had read, just as you have, that the surface of the earth is curved. Occasionally they would sight a ship in the distance. The tiny speck of white would grow and seem to rise above the waves until every part was visible. Now he saw a *proof* that the surface is curved.

U. S. Dept. of Agriculture, Bureau of Plant Industries, *Bulletin* 49.

FIG. 27. — Native Method of Tapping Rubber Tree in Central America.

The captain showed him how the vessel was kept in its proper course by following the finger of the *compass*. What a wonderful little instrument it is!

At first the winds were from the west. Then they came from the northeast. For a day or two they had been getting lighter, and now the sails scarcely moved. The surface of the sea was quite smooth. "We are in the *Doldrums*, or the Belt of Calms," said Mr. Linnard.

"Why is it calm?" inquired Ray.

"We are nearing the equator," replied his father. "This is the warmest part of the ocean. The warm belt extends entirely around the world. From both the north and the south the air moves in toward it just as the air moves toward a bonfire. Over this belt the air is slowly rising just as it rises over a bonfire. So you see, there is very little wind to drive a ship forward."

In the afternoon clouds gathered and the rain fell in torrents, but at night the stars shone brightly. This happened nearly every day. You must know that the Doldrums is sometimes called the *belt of daily rains*.

One day Ray's sharp eyes noticed that the ship was entering a band of yellowish water. He asked his father what it meant.

"This muddy water," said Mr. Linnard, "comes from the mighty Amazon. It sends far out to sea countless particles of the continent of South America."

"But where is the land?" questioned Ray.

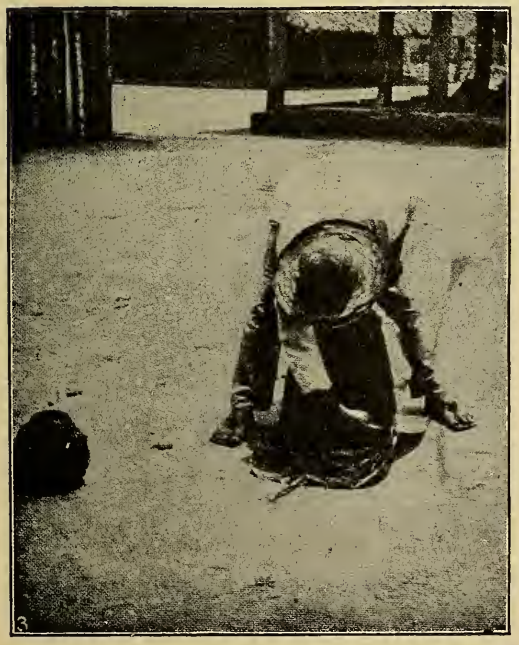
"We are still about a hundred miles from the coast of Brazil," returned his father.

Our friends watched anxiously for the shore, and you may be sure that they were glad when land was sighted.

In due time the ship anchored at Para. After a short stay in this city they sailed up the river on another ship.

For a time plantations are seen along the banks, but finally these disappear. A dark forest bordered by swamps extends as far as the eye can reach. The river is very wide, but in the distance the trees seem to meet over it.

These forests are called *silvas*. Do you know what that means? There are great vines as



U. S. Dept. of Agriculture, Bureau of Plant Industries, *Bull.*

IG. 28.—Native Method of Coagulating Milk of Rubber Tree

Spreading milk on leaf.
...sing two coated leaves together.
3. Pulling the leaf from the rubber
4. Finished sample of rubber

well as trees. These wind gracefully about the trunks, and stretch from limb to limb, binding the whole into a brotherhood.

In the marshes along the river are great white lilies with golden centers. These are called the *Victoria Regia*. Some of the blossoms are about a foot in diameter.

Although there are many animals in the silvas, they are very still during the day. In the evening all is changed. There are cries, growls, and hisses from the darkness. Now and then a pair of yellow eyes can be seen as the boat passes quite near to some animal on the bank. Occasionally the flapping of wings is heard as some bird flits in the gloomy shadows.

After several days Ray and his father left the ship, and were carried in a small launch up a tributary stream.

When they reached the rubber camp, they found a number of rude huts in a clearing. These were built of light poles and had thatched roofs. In them lived the Indians who did the work. The superintendent, who

was a white man, lived in a cabin. This he shared with his visitors.

One morning soon after their arrival, they went into the forest with one of the Indians to

FIG. 29.—A Rubber Camp.

see him tap the rubber trees and collect the milk. He carried a small hatchet, some tin cups, a lump of clay, and a gourd.

When they reached the first large rubber

tree, he made several cuts in the bark with his machete, or hatchet. With a bit of clay he fastened a cup below these cuts. A liquid looking much like milk slowly oozed out. The milk is contained in slender tubes which run lengthwise in the inner bark. So you see long cuts open these tubes in several places. For what other purpose are trees tapped?

The Indian attended to about one hundred trees. Our friends did not try to follow him everywhere, for in places he had to wade in water. His portion of the forest was called a path.

The milk which had collected in the cups since the Indian's visit of the day before was emptied into the gourd. All now started on their march toward camp.

Tramping through a tropical forest is not easy even when trails have been cut. Vegetation grows very rapidly. Why? Vines entangle the feet, and limbs strike against the face.

"See, father!" cried Ray, in great excitement. "There are some monkeys right over

our heads." A whole family of these interesting creatures was peering at them from a tree top. Having satisfied their curiosity, they disappeared, swinging from branch to branch much as you have seen them do in cages.

Dinner was ready when they reached camp. It was a very simple meal, but Ray thought that he had never eaten a better one.

In that country a plant called the *mandioca* grows. It has a root that resembles the sweet potato. From it tapioca is made. The mandioca is a very common article of food. The natives cook it with rice and black beans.

After dinner Ray and his father hunted up their companion, so that they might see the next part of the work.

They found the Indian seated before a fire in front of his hut. Over it he had placed a funnel-shaped chimney of clay. Smoke from the burning palm nuts poured from this.

One end of a long paddle called a *pellee* rested in a forked stick driven into the ground The Indian held the other end in one hand. The middle of the pellee was shaped like an

Fig. 30. — Gathering Rubber on a Paddle.

egg. This part was kept in the column of smoke.

The workman poured a small quantity of the milk on to the paddle, and slowly turned it. The rubber quickly hardened, and then more was put on. The piece of rubber kept growing as more milk was added. There was not milk enough in the gourd to finish the piece that day.

Ray saw a great many of the completed pieces in the huts. They were yellowish when first made, but they soon turned black. The people on the plantation called them *hams*.

In addition to the wild rubber trees, there were great numbers that had been planted. Ray asked his father to explain this. "Many of the trees," said Mr. Linnard. "have been ruined by careless tapping. Besides, the demand for rubber is steadily increasing, and so more trees are needed."

Name all the things you know that are made of rubber.

"Is Brazil the only country that produces rubber?" inquired Ray.

"No," returned his father. "It comes from many tropical countries. Mexico, Central America, India, and Africa are some of them."

After a stay of about two weeks, Mr. Linnard and his son prepared for the long journey to

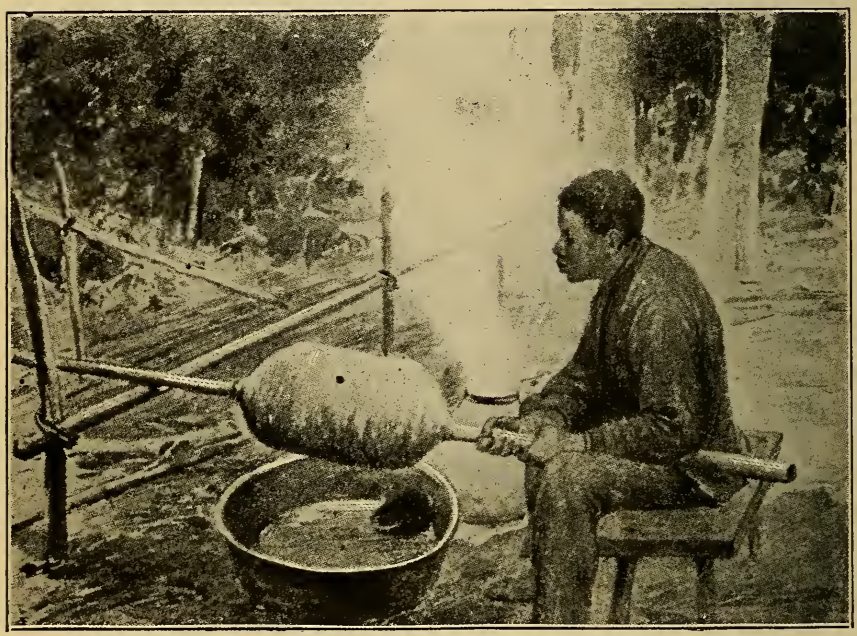


FIG. 31. — Making a "Ham." Observe the smoke coming out of the clay funnel.

New York. Several boat loads of *hams* were taken to the point where the small stream joins the Amazon. Here they were placed on a ship, and both passengers and freight started toward the coast.

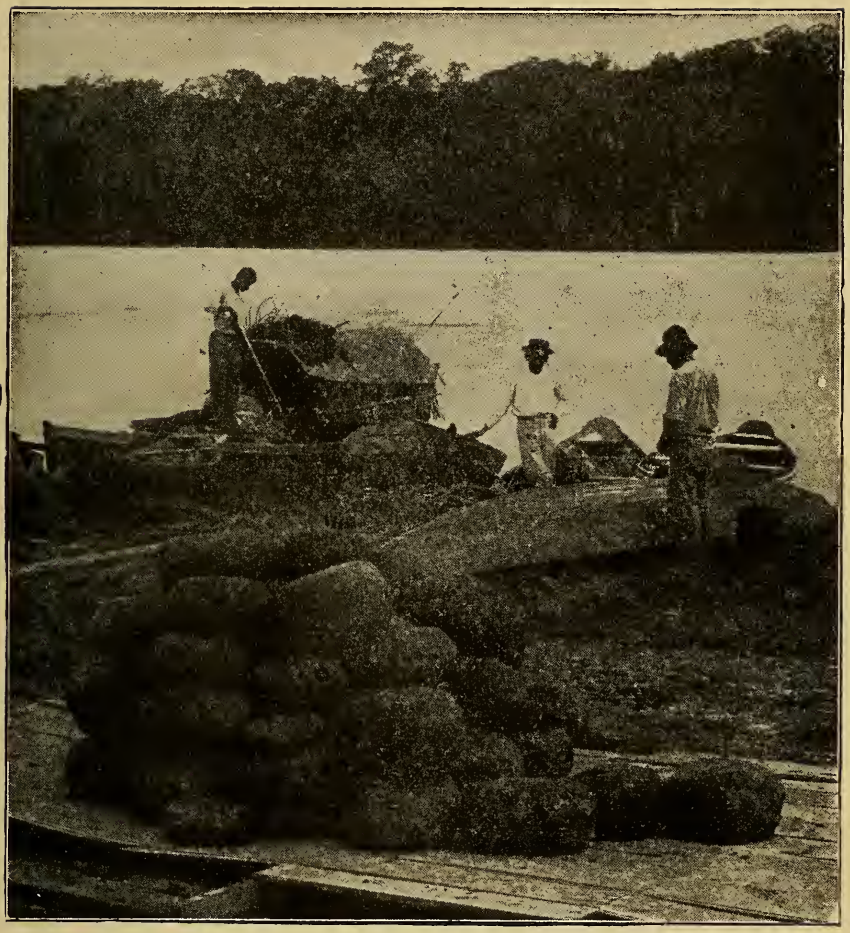


Fig. 32. — Crude Rubber ready for Shipment. The "hams" are in the foreground.

It seemed strange to Ray that the crude rubber must be shipped thousands of miles and made into articles of clothing, some of which were to be used in the very country from which it came.

"That," said Mr. Linnard, "is the way with nearly everything that we use. We cannot live as we now do without the help of people in all parts of the world. While the Indians in these forests are providing the material from which your rubber boots and coat are made, people in New York are making things to be sold to them."

At last the ship entered New York harbor, and soon afterward reached her wharf. Ray had had a delightful trip, and besides he had learned a great deal; but as the ship entered the outer harbor it seemed to him that he could not wait until he reached the wharf. Have *you* ever been away from home? You will not know how much you love it until you have been.

Some days after their return, Mr. Linnard and Ray visited a factory where rubber goods are made. Here the crude rubber is placed in tanks of hot water to soften. It is then cut up and run between great rollers weighing many tons. While it is in the rollers, water constantly falls upon it so as to wash it thoroughly. When the

rubber leaves the rollers, it is in great sheets. These are dried before being used.

Although many articles of clothing are made of rubber, boots and shoes were the only ones manufactured in this place.

After the crude rubber has been cleaned and ground, sulphur is mixed with it, and it is pressed by the rollers I have spoken of. If a shoe is to be made, the sheets are cut by hand into seven or eight pieces. More than twenty are needed for a boot. The pieces are then cemented together and varnished. After this they are placed on small cars and run into ovens. The heat hardens, or *vulcanizes*, the rubber.

"The first rubber shoes seen in America," said the superintendent of the factory, "were brought to Boston in 1823. The captain of a vessel brought them from South America. Of course they were more clumsy than those worn to-day, but people were much interested in them. The result was the beginning of their manufacture in our country. About one third of the crude rubber is now made into boots, shoes, and overshoes."

"How long has rubber been in use?" inquired Ray.

"For a long time," returned the superintendent. "At first, however, it was not used in making clothing. Do you know how it received its name?"

"No, I never thought of it," replied Ray.

"What use is made of it in the schoolroom?" continued the man.

"It is used to rub out words and figures," Ray answered.

"It was *rubbing* that gave it its name," said the superintendent. "It was used for this purpose by artists much more than one hundred years ago."

FURRY FRIENDS

HAVE you a cap, cloak, boa, gloves, muff, or any other article of clothing made of fur? Do you know who wore this soft, warm material before it was made into clothing for you? Listen.

In the northland the winters are long and cold. Snow remains on the ground for several months at a time, and the streams, which in the summer sang over rocky beds in the shade of tall pines, are silent. Why? Here the animals are dressed in their thickest and warmest coats of fur.

Cotton and flax do not grow here, and of course it is much too cold for the silkworm. On this account the people of these regions use the skins and furs of animals in making their garments. What do you know about the dress of the Eskimo?

But the people of the North are not the only

ones who use furs, as you know. Furs are used in many parts of the world. Think how useful they are to motormen, teamsters, section-men, and others who are out in the coldest winter weather. Then there are many others who use them because of their beauty as well as because of their warmth.

When you are snugly tucked in your warm beds in comfortable houses, there are miners, hunters, trappers, and travelers who are lying out under the stars rolled up in *sleeping bags*.

"What *is* a sleeping bag?" It is a fur bag a little longer than a person is tall. Into this a man crawls feet first. If it is *very* cold, he draws the top of the bag together by means of a cord.

In the northern part of our country, in Canada, and in northern Siberia there are many fur-bearing animals. In some parts the hunters and trappers are the only persons to be found. These men catch the animals and sell the furs to others, so that they are distributed to many parts of the world. Many of the trappers are Indians.

The life of the trapper is a lonely one. He seldom sees people except when he goes to the forts and towns to sell his furs. In order to be successful in his work he must know the habits of the various animals. He knows where each kind is likely to be found. He knows what the animals eat and how they obtain it. He recognizes the track of each when he sees it in the mud along the bank of a stream or in the snow. You see the trapper must *observe* closely. What wild animals do *you* know?

The trapper begins his work in the autumn, and continues through the winter and into the spring. Why does he not trap during the summer?

The homes of most of the fur-bearing animals are beside beautiful streams and lakes that are so abundant in the regions of which I have spoken.

Before the cold weather begins the trappers travel in canoes. These are often made of birch bark, and are so light that a man can carry one. I have seen Indians in the forests

of the North sitting in the bottoms of their canoes, which glided swiftly but silently over the water. When the ground is covered with a blanket of snow, the trappers use *snow shoes* Do you know what they are ?

Fig. 33. — Otter and Fisher.

There are many animals whose coats are useful to man. The otter, sable, mink, fox, fisher, marten, seal, beaver, muskrat, and bear are some of them. A few, such as the beaver, are now quite scarce because they have been caught in so great numbers.

Fig. 34.—Red Fox.

Generally the animals are caught in steel traps, but traps of other kinds are sometimes used. To each trap a short chain is attached, by means of which it can be fastened to a stake or a weight of some kind.

When the trapper has found the home of an animal, he carefully sets the trap where the animal will be likely to step into it as it enters or leaves. Sometimes the trap is covered with fine bits of mold, grass, and leaves. Often a piece of meat or fish is fastened above the trap so that the animal must jump in order to reach it, and thus get caught. Each morning the traps are examined, and the animals that have been caught are taken out. Of course, the traps must be set in new places from time to time.

As soon as possible after the animals are caught they are *skinned.* The skin is cut around the hind legs near the feet, and split down to the tail. It is then pulled down over the body as one might turn a stocking inside out. When the skin has been drawn as far as the fore legs, they are pulled right through,

leaving two holes in the fur. A few cuts separate the skin from the nose, and it is then ready to *stretch*. A skin can be stretched by slipping inside of it a small limb of a tree bent into the form of a capital U.

When the skins, or *pelts*, as they are called, are thoroughly dried, they are packed in bundles, and are then ready to sell. They are sometimes exchanged for knives, guns, tobacco, clothing, and other things, but generally they are sold for money.

The skins are taken to the nearest railroad station, whence they are sent to the cities where they are to be made into garments. St. Paul is the center of the fur trade in our country. Find it on the map. Here, more than seventy years ago, some fur traders built a few log huts.

A great deal of work is necessary in order to make the skins into articles of clothing. In addition to the soft, thick fur, there are generally long hairs in the coat. These must be removed. Then there is some flesh pulled off with the skin, which must be removed.

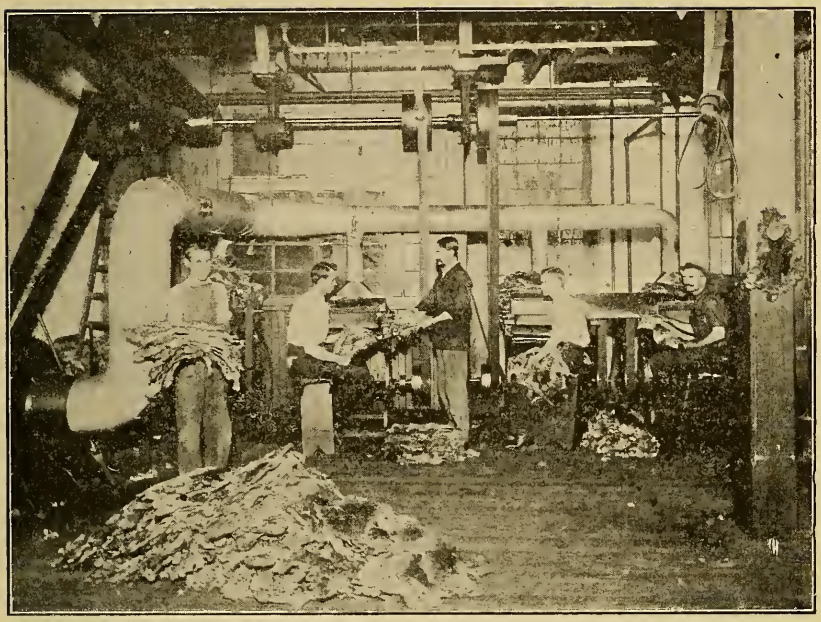


Fig. 35. — Sorting Furs.

This is done by drawing the skin against knives fastened in an upright position in frames. This work is called *fleshing*.

The skins are next washed in water containing alum. In this way they are toughened.

The next work is that of the *cutter*. He must plan his work very carefully, for the furs are valuable, and mistakes are expensive. He often cuts them into narrow bands which are afterward sewed together. This makes it possible to stretch them out a great deal.

Where there are so many furs to choose from, it is not difficult to match shades, and a coat that looks like one piece may contain hundreds.

Among the most valuable of the fur-bearing animals are the fur seal and the black and "silver-gray" foxes. I will tell you about the fur seal a little later. People often pay as much as $1000 for a fine pelt of a black fox, and half that amount for a "silver-gray" pelt. How much would a man earn in a year at $50 a month?

The mink is one of the most common of our fur-bearing animals. Its home is generally in a hole beside a stream or a lake. Sometimes, however, it lives in stone piles which the farmers have made in clearing the land.

The mink wears a brown coat, sometimes quite dark. Occasionally there are spots of white on it. The body is quite slender and the tail rather bushy. The mink is fond of the water; its food consists of fish, mice, moles, crabs, birds, and even poultry. Its bright eyes and sharp teeth are very useful to it in securing food.

The muskrat is quite a different animal. Its home is different, too. The house looks a great deal like the piles of hay which the farmer makes in his field.

Fig. 36. — The Mink.

You would like to see a muskrat at work, I am sure. With the broad front teeth it cuts off some of the tall reeds which grow in marshes and along the margins of some streams. These are carried in the mouth to

the spot where the house is to stand. Here they are built up into a conelike form, with an opening leading from the interior into the water. The door, then, you see, is under water, and there is no other way of getting in.

The houses extend from one to four feet above the water. The walls are several inches in thickness, and they keep out the cold quite well. When the homes are covered with snow, they are still warmer. On a bed made of grass the muskrat sleeps and spends the time when not in the water.

In the winter I have often approached the houses quietly, walking on the snow-covered ice. With my hatchet I would strike a sharp blow on the top, and instantly, if the owners were at home, I would hear them plunge into the water. I would then chop out a small piece of the wall and set a trap on the bed, fastening it by means of a stake driven firmly into the house. Then I would fill up the opening carefully and go to another house. Next morning I would examine my traps, take out the animals caught, and reset the

traps. Sometimes I have caught several muskrats in the same house.

The tail of the muskrat is hard and scaly, something like that of the ordinary rat. The muskrat is shorter and thicker than the mink,

Fig. 37. — The Muskrat.

and its fur is not so valuable. It contains many long hairs which have to be removed.

Sixty years ago the beaver was very common in many parts of our country, but now it is found only in the northern part and in Canada.

The fur of the beaver is very valuable. It is fine and soft, and usually of a chestnut color. The tail, which is covered with scales, is about three inches wide and nearly a foot in length.

Like the mink and muskrat, the beaver is very fond of the water and lives close to it. Its food consists largely of roots, bark, limbs, twigs, and leaves. Its home, or *lodge*, which is built in the water, is constructed partly of the same materials. On this account the beaver always lives near timber.

The walls of the lodge are very thick and strong. Mud and stones are mixed with the limbs, leaves, and bark, so that the house is water-tight. The inside measurements of the house may be as great as seven feet. Ten or a dozen beavers may live in the same lodge. As in the house of the muskrat, the door is under water.

You know that when men want to deepen the water at some point in a stream, they build a strong *dam*. This is just what the beavers do. These "beaver dams" are made of trees

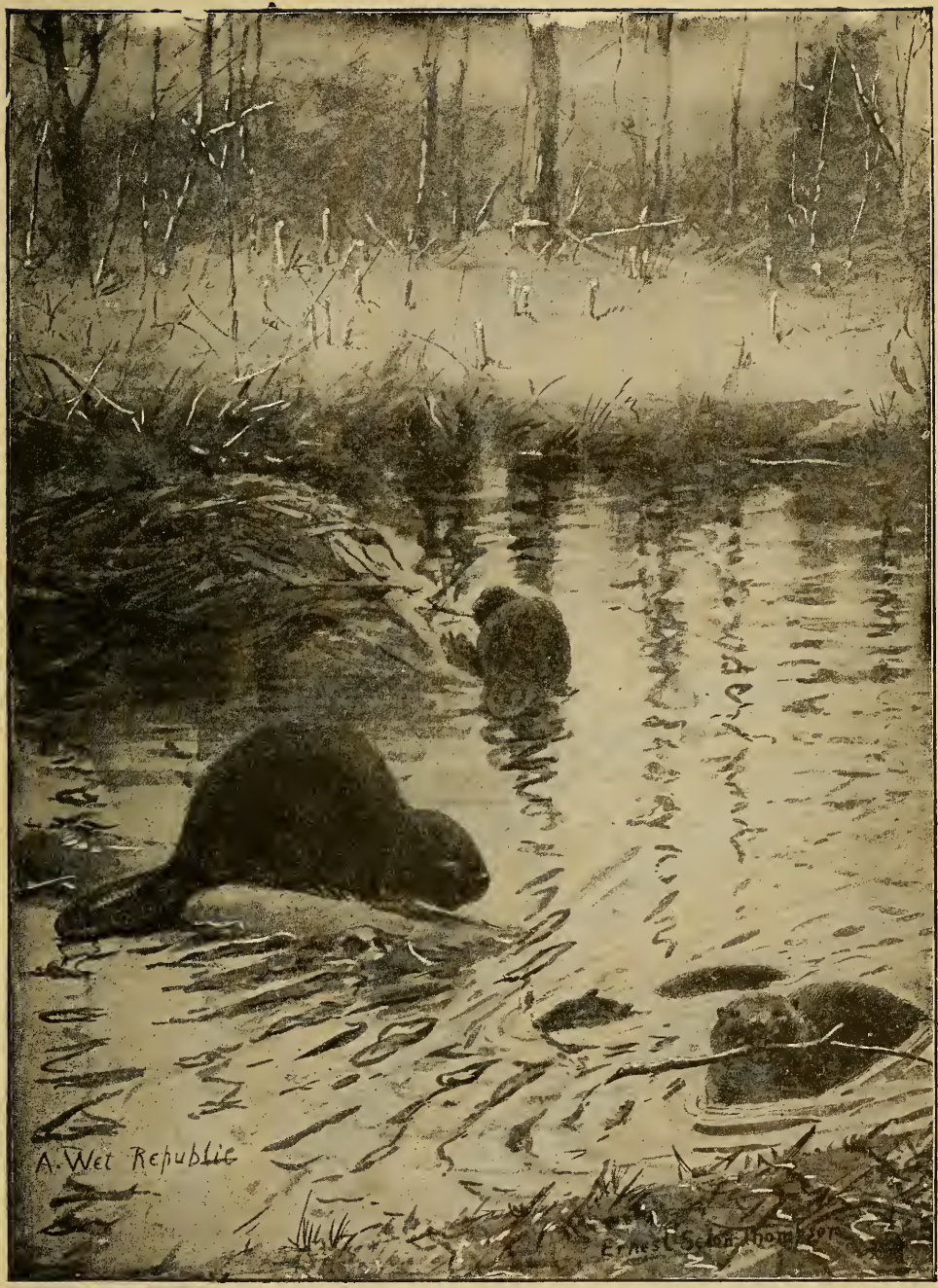


Fig. 38. — Beavers at Work.

sometimes as much as a foot in thickness. Limbs, bark, mud, and stones also are used.

How do you suppose a small animal can cut down a tree? Beavers have very strong teeth, and as they work in companies and are very industrious, they accomplish a great deal.

Fig. 39.—Trees gnawed by Beavers.

The beavers make the dams so that the water around their lodges will be too deep to freeze during the winter. What harm would freezing do?

Long ago beaver hats were very common both in our country and in England. In the

year 1638 the English parliament passed a law that the skins of these animals only should be used in making hats. As a result of this law the number of beavers in our country diminished rapidly. For a long time in England the word "beaver" meant hat.

A SUMMER WITH THE SEALS

It was the month of June, and Flossy's parents had moved to their summer home. As Flossy was born soon after their arrival, this was the only home of which she knew. They lived upon one of several small, rocky islands lying to the west of Alaska. On your map you will find them named the Pribilof Islands. Fogs and clouds often settle around them, so that they appear to be a little world by themselves. But, foggy or sunshiny, they receive little news from other places, for they are more than two hundred miles from the nearest land.

Because of what I have said you must not suppose that Flossy lacked for playmates. No, indeed. These islands were the summer home of many besides *her* parents. There were thousands of youngsters! You could see them in every direction, and you could hear the mothers

calling their children, for they often got mixed up during their play.

When they became tired of playing on shore, they went splashing into the water. They swam and they dived. They played with the

Fig. 40. — Sea Bear or Fur Seal.

long strings of kelp and with one another. You never heard of children so young as Flossy going into the ocean? Well, I have not yet had time to tell you that Flossy and her companions were *fur seals*. Fur seals are more at home in the water than on the land.

The seals live on the beach in great companies called *rookeries*. Each rookery is governed by a father seal who is known as a "beach master." They *are* masters, too, and all of the seals obey them.

Sometimes the different beach masters quarrel. They stand up straight and raise the long hairs on the backs of their necks. How they roar! Then the baby seals almost tumble from the rocks in their fright.

All of the seals wear soft, glossy coats of fur. Those of the males are darker than those of the females.

Their limbs are better fitted for swimming than for walking. They are called *flippers*. In swimming, the front flippers are used as oars, while the others stretch out straight behind. For their chief food seals eat fish, which they are very skillful in catching.

Day after day Flossy's mother lay upon the rocks and looked out to sea. She seemed to be in deep thought.

One day Flossy said, "Mother, what are you thinking of while you watch the blue waters?"

"I am thinking of our long, long journey to our winter home," she replied.

"But what do you want of any other home, mother? Surely, this one is pleasant."

"Yes," she answered, "it is pleasant *now*, but during the winter it would be a poor home indeed. It is bitter cold then. We shall start southward in the autumn."

"Is it far?" questioned Flossy.

"Hundreds of miles," returned the mother. "I have made the journey many times and am used to it, but the way will seem very long to you."

"Mother," continued Flossy, "I heard some strange sounds this morning, but I could see nothing."

"You heard the voices of men," replied the mother. "These strange creatures live upon the islands summer and winter. Their only thought seems to be to catch seals."

"Catch seals!" repeated Flossy. "What do they want of seals?"

"My child," said her mother, "our beautiful coats of fur are wanted by people in many

parts of the great world. They make them into garments. You will learn more about it soon."

That afternoon as Flossy and her playmates were sporting in the waves, she asked them whether they knew anything of the seal hunters. They had never heard of them, they said, and they were not going to worry about the matter.

For several days things went on as usual at the "rookeries." If you could have visited them on any of those summer days, you would have seen interesting sights. You would have seen seals bathing, fishing, and playing in the water, and others playing or sleeping on the rocks. You would have seen some sitting up straight, but fast asleep, and others lying on their backs waving their flippers in the air like fans.

One bright morning Flossy and many others heard again the sounds of which she had told her mother. This time they saw the men, too. Some of the older seals said that they are called *Aleuts*. See whether you can find on the map the Aleutian Islands.

The men slowly drove the seals back from the rookeries. They permitted them to rest frequently. Every few minutes some of the mothers and the younger seals were sorted out and allowed to return to the beach.

"What does this mean?" whispered Flossy. "If they want our fur for garments, why do they let some of us escape?"

"The mothers and the young ones are never killed," she replied. "They will sort *us* out pretty soon."

It was as she said. In a few minutes they were turned back, and after resting a little, they started for the rookery.

At last they were lying once more upon the rocks against which their old friends, the waves, dashed. "Now, mother," said Flossy, "please tell me all about it."

"Well," returned the mother, "I will tell all that it is necessary to know.

"Many of our friends will be killed, and their shiny coats will be removed. These the men will take to a house and pack in salt. After a time a great ship will come and take

them to a city far to the south called San Francisco."

"Are they made into clothing there?" asked Flossy.

"No," replied the mother. "These men are curious creatures. This is but a small part of the journey. We shall swim past the city this fall. Other ships sail for weeks with the furs on board until they reach the great city of London. There live the *furriers* who make the sealskin garments.

"The furriers make beautiful coats, collars, boas, muffs, caps, and gloves. These garments are worn by people in many parts of the world, and they are quite expensive. Now you see why the Aleuts live here and why they want our fur.

"I wonder," she continued with a sigh, "how many of the people who so enjoy our beautiful fur, know how and where we live and how it is obtained."

A SPOOL OF THREAD

You now know something of the different materials of which your clothing is made. Each is very important, and we would not be willing to spare one of them. To make such garments as we wear to-day, something besides cloth is needed, however. In order to make dresses, coats, hats, gloves, shoes, and the other articles of clothing we must have *thread*. Without this we would have to dress as people did in the olden time, — in loose, ill-fitting garments.

It is not only in the *making* of garments that thread is necessary. Think how important it is in *mending* them. It is used for this purpose in every home almost daily. The fine thread wound so neatly on this spool is very different from that used by our ancestors.

Open and close your hand, looking at the front of your wrist. You see two cords which you can trace nearly to your elbow. There

are many such cords in the body. They are called *tendons*, and they bind the muscles to the bones. Tendons are found in the bodies of the lower animals also. People often speak of them as *sinews*.

In the times when people dressed in coarse, simple garments, these sinews were often used as thread. Sometimes narrow strips of leather were used for the same purpose. In some places these are still used. *You* would hardly call the work that people did with this thread *sewing*. Holes were made in the garments and the thread was drawn through. It was more like lacing.

The people of Egypt learned to make thread from flax long, long ago. What have you learned about the Egyptians?

See how strong and fine this thread is. It is marked "spool cotton," so you know of what it is made.

Here is a spool marked "silk," and here is another upon which is the word "linen." Of what is linen made? See whether you can find any thread made from wool.

Thread is first spun into coils called *hanks*. It is then wound on *bobbins*, two or three strands being twisted together to make it stronger.

The bobbins are then taken to what are called *twisting frames*, and the thread is doubled and twisted again. Examine spools and see whether you find some marked "four cord" and some "six cord."

Next the thread is bleached, and if white thread is not wanted, it is dyed.

Again the thread is wound on spools. Usually a spool contains two hundred, three hundred, or four hundred yards. The thread on a four-hundred-yard spool would reach nearly one fourth of a mile, or the distance of two ordinary city blocks. Think of a thread of this length being twisted from cotton fibres less than two inches long.

Find how the thread is fastened when enough has been wound on a spool. Why is there a hole through the spool? When spools were first made in Europe, the people returned the empty ones and were paid for them.

Why do we not return the spools to-day?

NEEDLES

One can hardly imagine people getting along without needles. There was a time when no one had ever seen such needles as we now use. Indeed, there are people living to-day who have never seen them.

In that long ago time the sharp thorns of certain trees and bushes furnished substitutes for needles. Sometimes people sharpened the slender bones of birds and fishes. Of course fine sewing cannot be done with such needles.

At first these needles were used for making holes in the clothing. Thongs or strings were put through the holes, and so the garments were sewed.

When metal needles were first made, they had no eyes. The thread was tied to the large end. You see how much improvement there has been.

Probably the Chinese were the inventors of

metal needles. At any rate they have used them for a long, long time. The people of Europe learned the art from the Moors. More than one hundred years before Columbus discovered America steel needles were being made in Germany. When was America discovered?

One day there came to the city of London a mysterious Moor, who opened a little shop in which he sold needles and pins. So well made were they that some of the people thought he had the help of evil spirits in his work. They wanted to persecute him, but he was protected.

For a long time after people first settled in America, they bought their needles and pins of the mother country. During the Revolutionary War, needles were quite scarce and the Americans commenced to manufacture them. They were not so good as needles made in England, however, and when there was peace once more, the Americans gave up making them. Now great quantities of excellent needles are made in New England.

To-day needles are made of fine steel wire. The wire is cut into pieces long enough to make

two needles each. A great many of these wires are placed in a bundle and held together by two bands of iron. They are then heated and made perfectly straight.

Here is a man grinding needles. Let us see how he does it. He holds one end against a rapidly revolving grindstone. By carefully turning the wires with his fingers they are smoothly and perfectly ground. After finishing one end he grinds the other.

You know that the eye end of a needle is somewhat flattened. By moving on a few steps we can see how this flattening is produced. The double end of the needle is placed under a weight which falls, striking it in the center. Besides flattening it, this punches two holes for eyes and makes a cut between them. Now it is easy to break the steel along the line of this cut. By doing this, our double needle is changed into two separate ones.

If needles bent as pins do, they would not be as useful as they are. In order to make them brittle they are covered with oil and heated. This treatment *tempers* them.

To make the needles bright, they are wrapped in strong canvas containing emery powder and sand. The bundles are then rolled between pieces of wood by machinery, for a few hours.

Here is a workman placing the needles of a certain length together. This is called *evening*. The next is arranging them so that the heads all point in the same direction. His work is *heading*. After this they are placed in packages.

It it said that one thousand dollars' worth of needles can be made from seventy-five dollars' worth of fine steel wire.

Think of the work and the workmen necessary to make one of these useful articles. The miner must dig the iron from the earth. It is then shipped to some city where it is melted, and refined into steel. Then the steel must be drawn out into wire and the wire made into needles. You see that it would be impossible for each family to make its own needles.

Of course much of our clothing is now made by machines, but needles do the sewing. They are almost as important in mending our clothing as they are in making it.

PINS

LIKE needles, the first pins were made of thorns and bones. In some parts of the world metal pins have been in use for ages. In some of the tombs of Egypt pins of bronze and copper have been found. Pins like our hat pins, and others like the safety pins of to-day, were used by people in very ancient times. The first pins made in our country were nothing but bits of wire. This was rolled up at one end to form a head, while the other end was sharpened.

Now that you have seen how needles are made no doubt you would like to visit a pin factory. When the pins have been cut from the wire, they drop through a long, narrow slot as far as their heads. Here they are held while a revolving roller sharpens them. As fast as they are pointed the machinery moves them on and others take their places.

You have noticed that pins that have been

used a great deal often have a dull, brassy appearance, while new ones are bright and shiny. This silvery appearance is caused by coating them with tin when they are made.

Of course it would be very slow work to put the pins in papers by hand. It used to be done in this way, but now machines do even this. The papers are folded and the holes made in them by machinery. Into another machine one person, generally a child, puts the pins, while another puts in the papers. By a wonderful process the machine puts the pins into the proper places in the papers.

So many pins are made in our country that if they were equally divided, every man, woman, and child would have more than one hundred new ones each year.

SEWING MACHINES

ALTHOUGH not a very large machine, the sewing machine is one of the most useful. Think of sewing by means of a machine, as compared with using a bone or a thorn for the same purpose. We should find it very hard indeed to get along now without these useful machines.

You know that people once did get along with nothing but the old-fashioned needles. They did not live as we do now, however.

It is but little more than sixty years ago that a mechanic by the name of Elias Howe invented the sewing machine. One day he heard some men talking about inventing a machine to do knitting. This led Mr. Howe to think about making a machine to do sewing.

He worked earnestly, and at last he was successful, but he had no money. He could not make sewing machines to sell to other people without means. On account of poverty those

who invent useful things do not always get much benefit from them. Finally a friend agreed to board Mr. Howe and his family for a while. He also gave him $500 for a half interest in the *patent.*

A patent is a paper which our government gives to inventors. This paper states that for seventeen years no one else shall be allowed to make the thing which the inventor has discovered or contrived. The word "patented" is stamped upon the article, together with the date. Is it right to keep others from making a thing that a man has invented? Find some articles that are patented.

For a long time after Mr. Howe had made his first machines, people did not want to buy them. They did not believe that they would be of much use. Even after Mr. Howe's friend had spent $2000 but few customers were to be had.

Of course this was very discouraging, and Mr. Howe finally went to England to see whether he could do any better there. He sold the patent in that country for about $1000. He was to receive besides about $15 on every machine sold.

His expenses had been so great that when he returned to his native land he was almost without a dollar. Other people had taken advantage of what he had worked out, and had made machines almost like his. This led to a great deal of trouble. At last it was settled, and before his death Howe had received about $2,000,000.

The sewing machines that are in use to-day are much better than the first ones that Mr. Howe made. They run more easily and more rapidly, and do much better work.

The use of sewing machines made it possible to make clothing very much more rapidly than it could be made by hand. The result was that clothing became cheaper, to the benefit of all. Women can now earn more money sewing than formerly, and they do not have to work so many hours each day.

Several million sewing machines are now in use. In many countries they are to be found in the homes of the rich and poor. More machines are made in our country than in any other.

Have you ever seen a sewing machine used for anything but sewing cloth? They are used in every boot and shoe factory. In every glove factory they are used, and even harnesses are sewed by them.

You see how much the world owes to one of its greatest inventors. Name other inventors.

THE SHOEMAKER'S STORY

Mr. Robbins lives in a neat, white cottage that stands a short distance back from the street in a little village. Just above the door is a board swinging on an iron rod. A boot and a shoe are painted on it. Now you know what Mr. Robbins does in the little shop. All of the children in the village know him and love him. He is always glad to see them and he tells them many interesting stories.

Gordon and Florence live on a farm about a half a mile from the village. They were much pleased one morning when their father asked them whether they would like to take a pair of shoes to the shoemaker. The shoes were to be *half soled* and the children were told that they might stay until the work was finished.

"What have we here?" asked the shoemaker, as Gordon handed him the package

"Yes," said he, as he examined the shoes. "I can fix them this morning." He put on his spectacles and his leather apron, and commenced to work.

Within easy reach were pieces of leather, a hammer, awl, knife, thread, needles, and other things. On a shelf were the shoes that had been finished and were waiting for their owners.

Mr. Robbins cut soles from thick leather, and placed them in a basin of water to soften. Then he began to remove the worn-out soles.

"How would *you* like to be a shoemaker, Gordon?" he asked.

"I am afraid it would take me a long time to make a pair of shoes," replied Gordon.

"Very few shoemakers make shoes *now*," said Mr. Robbins.

Gordon looked much surprised. "Then who *does* make them?" he inquired.

"Nearly all of the shoes used to-day are made by machinery, in great factories. When I was a boy, it was quite different."

"Have you always been a shoemaker?" asked Florence.

"Yes, I commenced to learn the trade when I was a boy. I worked in my father's shop, for he, too, made boots and shoes. In those days the shoemakers *made* as well as *mended* shoes. They often traveled from house to house, doing the work for the families.

"When our country was first settled, shoemakers were very much needed. People were very glad to have them come from the mother country. In 1629 the *Mayflower* brought one to New England. The people where he settled gave him about $50 a year and fifty acres of land."

What do you know about the *Mayflower?*

"Where are most of the shoes made now?" asked Gordon.

"In New England. You know that the New England states are very important states in manufacturing many things. Brockton and Lynn are called *shoe towns.* When you go home, see whether you can find where they are."

"Please tell us about shoemaking," said Florence.

"That is a pretty big story," said Mr. Robbins, "but I think there will be time. To begin with, do you know where leather comes from?"

"From the Western States, where cattle are raised," replied Gordon.

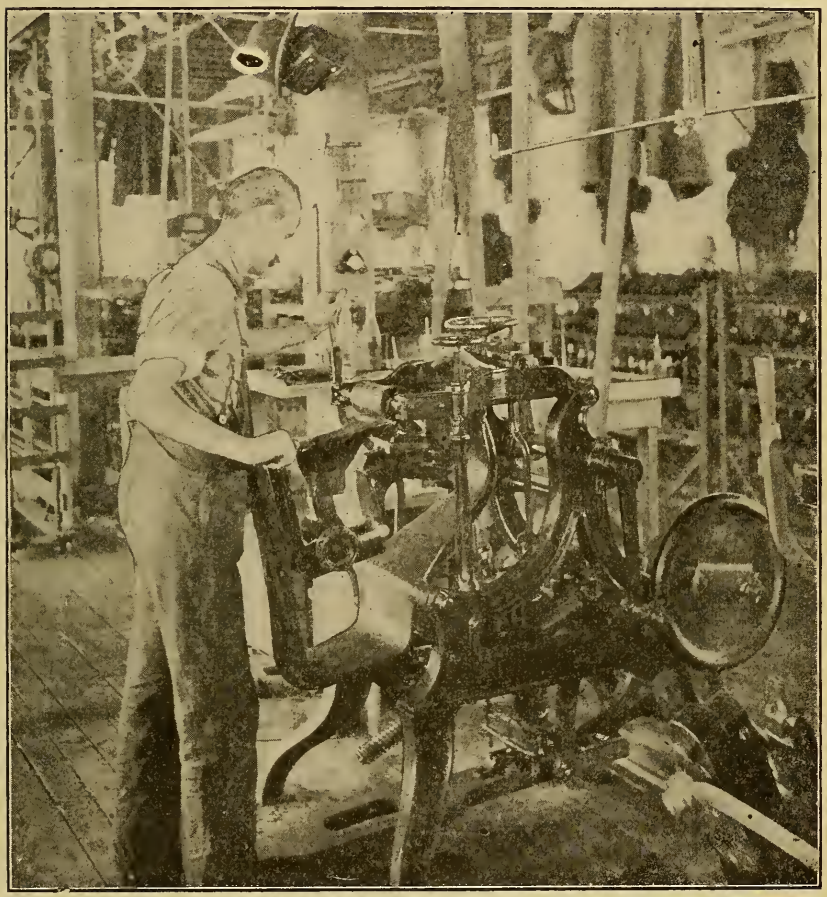
"Yes, but these states do not furnish enough to supply our factories. We buy much leather from Mexico and South America. Great herds of cattle are raised on the *Llanos* and *Pampas*, as the grassy plains of South America are called.

"Cattle are not the only animals that furnish leather. The skins of sheep, goats, horses, kangaroos, and even alligators are used. Many alligators are caught in the dark swamps of the South. Before skins can be made into shoes they must be *tanned*. Tanning hardens the skin and makes it wear well.

"A great shoe factory is very different from my little shop. As I have told you, most of the work is done by machines, but many persons are needed to take charge of these.

"There are cards or tickets describing the shoes

to be made. These are passed from worker to worker, and each does his or her part.



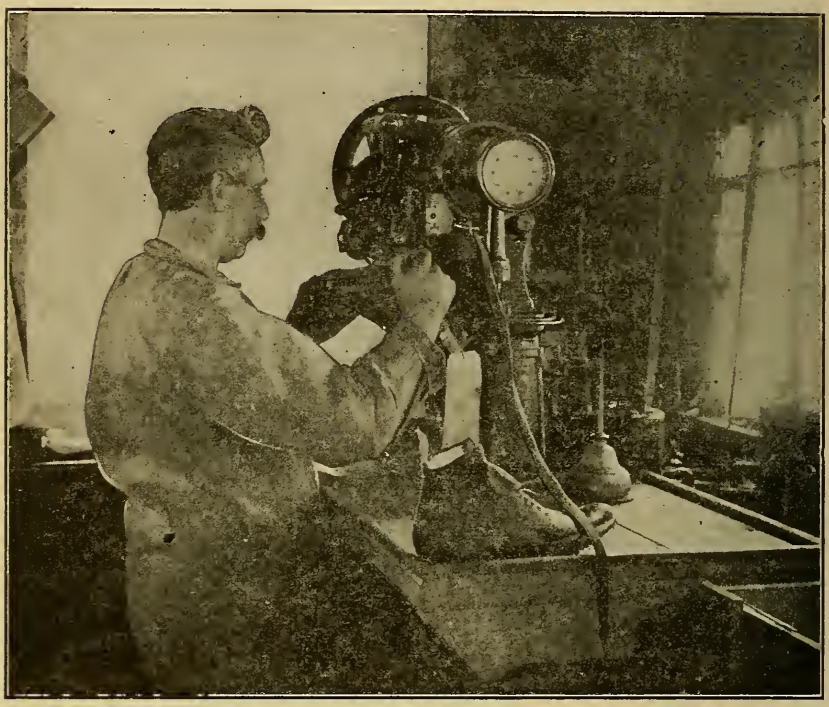
Courtesy of Regal Shoe Company

FIG. 41. — Leveling the Sole.

"In one room the soles are cut out. These are made of heavy leather such as that I am using for these shoes. In another room the

uppers are made. These are cut out by hand. Calfskin is generally used for this purpose."

Mr. Robbins asked the children whether they knew what the uppers are. Do *you* know?



Courtesy of Regal Shoe Company.

FIG. 42. — Sewing on the Welt.

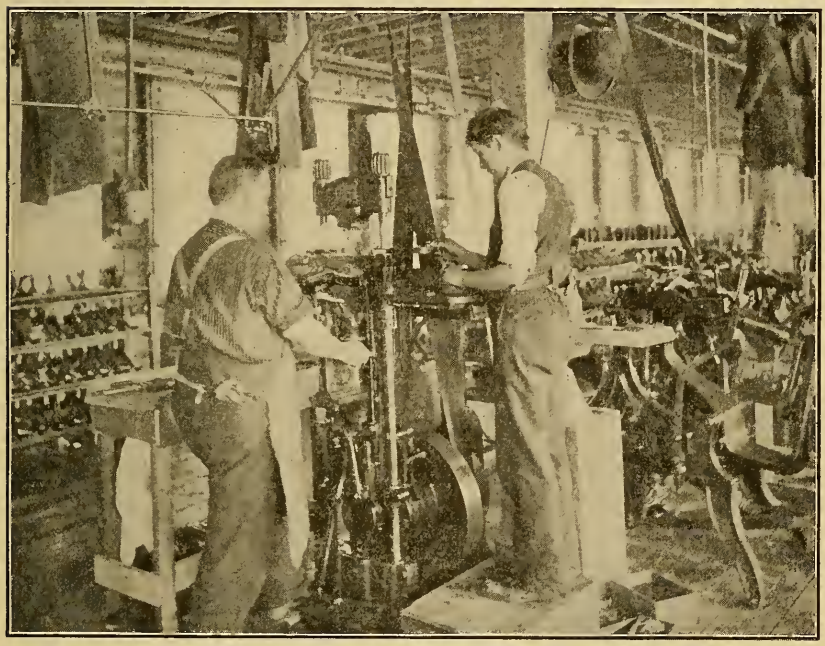
"After all the parts including the trimmings have been cut out they are put together," continued Mr. Robbins.

"How are the soles and the uppers joined?" asked Gordon.

Courtesy of Regal Shoe Company.

FIG. 43. — Stitching the Vamp

"By wonderful sewing machines. Girls and women do most of the work. Some women can sew eight hundred pairs in a day. They sew the leather as easily as ordinary machines sew cloth.



Courtesy of Regal Shoe Company.

FIG. 44. — Putting on Heels.

"Look at the heels of your shoes and you will see nails in them. These are cut by machinery from a coil of steel wire and driven at the same time."

"How long does it take to make a pair of shoes?" inquired Gordon.

"A pair *can* be made in fifteen minutes," replied Mr. Robbins. "Often as many as forty people work on a pair. Some of the factories turn out thousands of pairs in a day. I used to feel satisfied when I had made *one* pair in a day."

"Are all shoes made of leather?" asked Florence.

"Oh, no," replied her friend. "I must tell you about the shoes in some other countries.

"You would think it very odd to leave your shoes at the door every time you entered your home or the schoolhouse."

"Do people *really* do that, Mr. Robbins?" asked the children, in astonishment.

"If you were passing by a home in Holland you might see *wooden* shoes standing just outside the door. It is a good way to tell who is at home, you see. The shoes are called *klamps* in some places and *pattens* in others. They are low and are hollowed out of wood. They make a curious sound as their wearers walk along. Of course it is not much trouble to take them off. Very often the floors of the rooms are covered

with clean white sand. In Belgium and in some parts of France shoes of the same sort are worn."

I wonder whether the children knew where Holland is. Do you? Read the delightful story of Hans Brinker, and you will learn many interesting things about this country and its people.

"Well," said Mr. Robbins, "I think there is nothing more to do but to black the shoes. You will have to wait a few minutes for them to dry."

The children were anxious to hear something more about shoes while they were waiting.

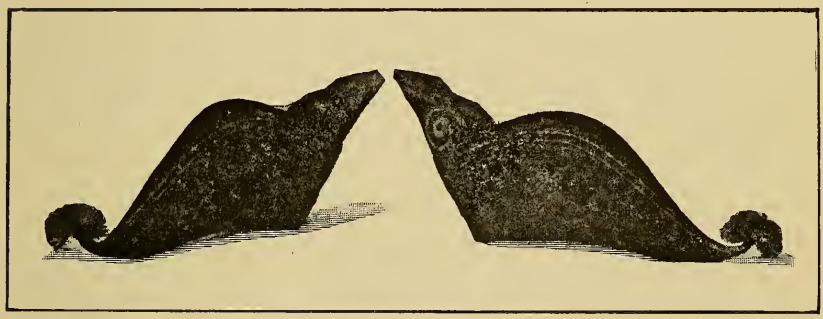


FIG. 45. — Chinese Shoes worn by Women of the Upper Classes.

"If you could see a Chinaman, you would think his shoes as curious as those of the Hollanders," continued the shoemaker. "They are low. The soles are thick and are made of wood.

Some of them are not flat on the bottom as your shoes are, but are quite rounded like the bottoms of some boats. On this account, walking is rather difficult. The uppers are of cloth. They are often brightly colored and decorated.

Fig. 46. — Corean Shoes.

"In China it is thought to be a disgrace for women of the upper classes to wear large shoes. On this account the feet of the baby girls are bound, to prevent their growth."

"Are sandals shoes?" inquired Florence.

"They are more like slippers," answered Mr. Robbins. "They were worn in Bible times, and are still worn in Egypt, the Holy Land, Mexico, and other warm countries. The sandal consists of a sole fastened to the foot by cords that pass between the toes and around the ankle."

"They must be like those that little children sometimes wear here," said Florence.

"Yes, they are very much the same," returned her friend. "Sometimes sandals are made of light wood, sometimes of leather, and sometimes of straw.

"In England very odd-looking shoes used to be worn. Perhaps you can find pictures of them in some of the old histories. The toes were pointed and curved upward. Sometimes they reached nearly as high as the knee. Bells, and chains

Fig. 47. — Shoes worn by Hawaiians.

of gold and silver, were fastened to them. The church thought this fashion wicked, and finally it was forbidden by law."

Gordon paid for the mending of the shoes, and the children started homeward well pleased with the shoemaker's story.

HOW HATS ARE MADE

In most parts of the world some sort of covering is worn upon the head. You must not think that *all* hats are like those that you see worn in this country. When I have told you of the styles in some countries, you will think them very odd, I am sure.

Let us visit our Eskimo friends, dressed in their suits of fur. Their black eyes peep out from beneath *hoods* of fur instead of hats. They do not take off their hoods and hang them up as we do our hats, but simply push them back from their heads. Look closely. I see a second pair of eyes twinkling within the deep hood of that Eskimo mother. What can it mean? The hood is both a headdress and a cradle. Within this soft, warm nest, a child of the snow will spend much of its time until it is old enough to walk.

Here is a genuine American. Let us observe

FIG. 48.—A Family of Pueblo Indians.

him. He is tall and straight. His skin is somewhat red or copper colored. Coarse black hair hangs over his shoulders. "This is an Indian," you say. To be sure. The Indians are the *real* Americans.

This man's hat consists of a band, to which are fastened the feathers of the eagle and the teeth of the bear. He is a *chief*. Many of the people of his tribe wear no covering upon the head when it is warm. In cold weather they draw their blankets over their heads.

Now we are in Mexico. Here the sunshine is bright and warm, for much of the country is within the *torrid zone*.

Are not these strange hats that you see? They are called *sombreros*. Only the men wear them. The headdress of the women is a shawl called a *mantilla*.

See how high and pointed the crowns of the sombreros are.

Some are of straw, and others are of felt See the gold and silver braid on that one It cost not less than $50.

In Turkey a hat called a *fez* is worn. It

was given this name because such hats were first made in the city of Fez. The hat is of wool and has no brim. Fastened to the top is a colored tassel.

In far-away India a very strange hat is worn. It is called a *turban*, and is made of many yards

Fig. 49. — Hats worn by Natives along the Congo River.

of white cloth wound around the head. Do you think that it is the custom in India to raise the hat as a salute?

The working people in Japan, China, and the Hawaiian Islands wear hats that look like shallow baskets. They are made of grasses, and are often more than two feet in diameter.

You see that headdresses are of many differ-

ent kinds. Differences in climate, in taste, and in the religion of people are some of the reasons that account for this. Mention some religious organizations in our country that have their own style of headdress.

Many of the hats worn by both men and women are known as *felt* hats. If you examine such a hat closely, you will find that it is composed of fine, short hairs. Felt is made of fur or wool, or of a mixture of the two.

Not all kinds of fur can be used in making hats. That of some animals, such as the rabbit, coney, nutria, beaver, muskrat, cat, and raccoon, has little barbs upon each hair. Each barb points away from the body. When the fur of a cat is stroked in the *wrong direction*, these barbs give it a rough feeling. Because of these barbs the hairs can be made to fasten themselves together easily.

When the fur of an animal is to be made into hats, it is cleaned and the long hairs are pulled out. The fur is cut from the skin by machinery. It is then mixed and put into a machine called a *blower*. Here it is tossed and blown about

like a fleecy cloud. Only a few ounces of fur are required to make a hat.

When the hatter is ready to make a hat, the fur or wool is allowed to fall upon a slowly revolving hollow form of brass. The shape of

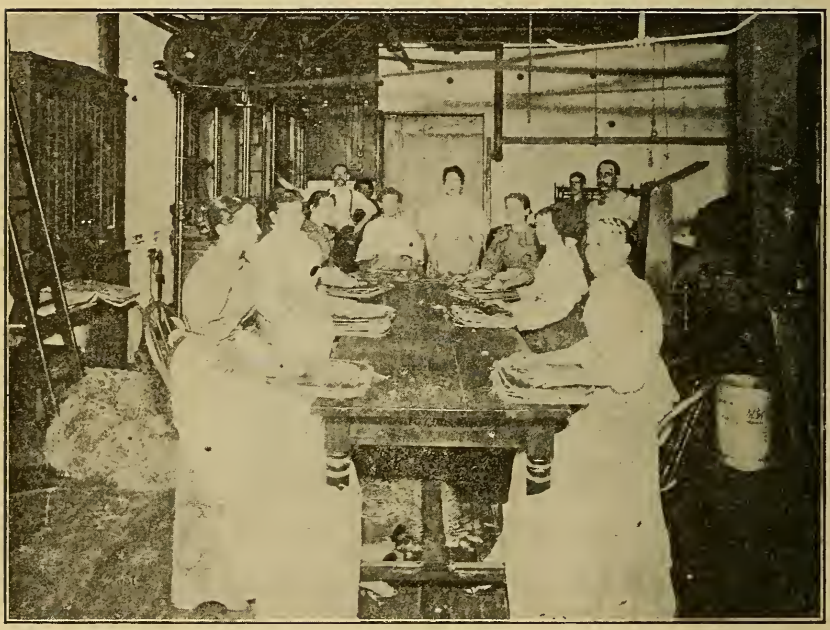


Fig. 50. — Cutting Furs for Hats.

this is like that of the crown of a hat. There are many small holes in this cone. Air is drawn in through these, with the result that the hair sticks to the cone. In about two or three minutes the fur is thick enough and is removed. It is now in the form of a hat, and

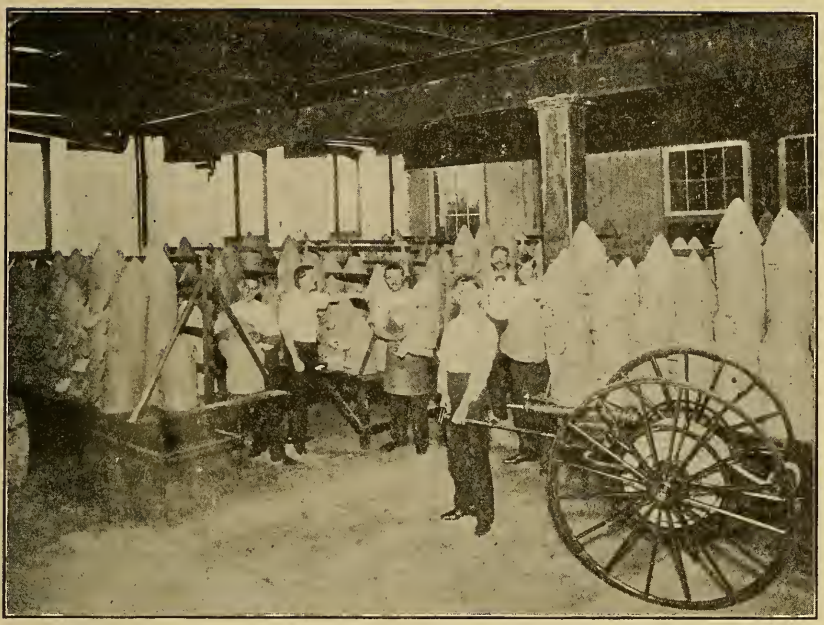


FIG. 51. — Blocking Hats.

the machine is therefore called a *forming* machine. Sometimes the forms are double and two hats are formed at once.

You must not think that the hat is now ready for use. About ten days are required to finish it, and many different people help in the work.

The brim of a soft hat is a little stiffer than the crown. *Shellac* is used to produce this stiffening. In making *derby* hats, all parts are stiffened

The hats are formed on blocks, resembling in shape the head. In addition to this work there is the dyeing, the sewing on of the sweat-band, the outside band, and the binding of the edge. After being packed in pasteboard boxes, the hats are put into large wooden cases and shipped.

The tall, shiny hats sometimes worn by men are made of silk plush and muslin. Two or three layers of muslin are soaked in varnish and pressed together. Out of this stiff material the pieces of the hat are cut. These are then fitted together about a block, and a covering of silk plush is put on. The two layers are smoothly fastened together by being ironed. They are finished about as the other hats are.

Years ago people used to make their own straw hats. Now they are nearly all made by machines in great hat factories.

The straw is made into braids, and is then washed. It is *bleached* or whitened by being hung up in a room in which sulphur is burned. Of course dry straw breaks easily, so before sewing begins the braids are dampened.

FIG. 52. — Unfinished Hats.

Work begins on the *button* in the middle of the crown. A few rows of braid are put on by hand, but machines do the rest.

A sort of mat is made for the crown. This is placed on a block and bent down around the edge. Other braids are then added for the body of the hat. When the crown is high enough, the edge is turned up and the rim is made. To stiffen the hat it is given a bath of glue.

Many straw hats are made by the peasant women of Italy. It is said that they weave braids and make hats while walking along the road or while visiting.

You know that Panama hats are very expensive. They are made of the leaves of a palm tree that grows in South America and in Central America. On their way to the United States many of these hats cross the Isthmus of Panama. Now you see a reason for their name. They are not called Panama hats by the people who make them.

Only the best leaves of the palm are used in hat making. These the natives split into narrow strips with their finger nails. As the straw breaks when dry, they can work only in the early morning. Each night the hat is placed out of doors so that it will get damp. On this account it takes a long time to make a hat—sometimes more than three months. Men, women, and children work at hat making, but only the best workmen can make the high-priced hats.

Ladies' hats, like those worn by men, are made

of felt or straw. Of course there is more variety in the shape and trimming. Men's hats are always finished before the customers buy them, but ladies' hats are often trimmed afterwards.

It used to be very common to see hats ornamented with beautiful birds. Would you not much rather see these little friends alive, and hear them singing sweetly in their homes? I am glad to tell you that there are many people who believe it is not right to kill them for this purpose. In many cities societies called *Audubon* societies have been formed to protect the birds. Do *you* belong to one of these?

A PAIR OF GLOVES

EVERY time that one goes out on the street, whether it is summer or winter, people are seen wearing gloves. This is true in most parts of the world. In the cold countries heavy gloves and mittens are worn in winter.

You have seen gloves of leather, fur, silk, cotton, and wool. When your fathers and mothers were children, mittens were more common than gloves. Often they were of yarn, and were knit by some member of the family. I have worn many pairs of such mittens, and I have often watched them grow as my grandmother's knitting needles flew back and forth. Have you ever seen any one knit?

More than one half of all the leather gloves and mittens made in our country are made in or near two cities. The cities are close together, too. Isn't that strange? One of the cities is called Gloversville. It is in the eastern part of New

York State. See whether you can find it on the map. Of course you have already guessed how it got its name. The name of the other city is Johnston. Gloversville was settled by glove makers who came from Scotland. So, you see, it was a village of gloves.

Not all of the gloves are made in the factories of Gloversville and Johnston. Many of the people in the surrounding country work at the same business. Delivery wagons take gloves from the factories to the farmers' houses. Girls and women finish them and the wagons call for the work.

In the glove factories may be seen many kinds of skins. Sheepskins are used more than any others. Skins of the dog, deer, calf, goat, bear, fox, beaver, and other animals also are used. The skins are tanned, and in most cases the hair or fur is removed before the gloves are made. By soaking the skins in water containing lime, the hair is loosened. The skin is not dyed as cloth is. The colors are put on with a brush.

I wish that you could see how the gloves are cut out. You can get a pretty good idea

of it in this way. Take a piece of paper long enough for a glove, and fold it lengthwise. This gives you the front and back of a glove. Lay your hand on the paper and draw a line around the hand and between your fingers. Do not outline your thumb. With your scissors cut along the lines that you drew between your fingers. You will then have a glove without a thumb. The thumbs are made separately.

Machines do the cutting, and many gloves are cut out at once. The "cutter" must plan very carefully, or a great deal of leather would be wasted.

The sewing is done by machines fastened to long tables. The machines are run by steam or electricity.

You have noticed that the fingers have side pieces. These are called *gussets*.

Many persons work on the same pair of gloves. Each does his or her part. Those who put the embroidery on the back are called "silkers." The edge of the wrist is hemmed by "welters." Still others make the buttonholes and put on the buttons or fasteners, and pack the gloves.

When gloves and mittens were first made in the section mentioned, the farmers and wood choppers used all of them. After a few years a man took a wagon load to Boston. He found that people were ready to buy them, and he sold them all. It took him six weeks to make the trip, for there was no railroad then. Now it would be easy to make the trip in two days.

People have worn gloves for ages. In the cold countries they wore them to protect their hands, but in the warm countries they were often a sign of royalty. Some of the gloves were decorated with birds, butterflies, and flowers worked in colors.

In olden times a sport called *hawking* was very popular. Hawks and falcons were trained to catch birds and rabbits. The hunters rode into the fields, carrying the hawks on their wrists. To protect their wrists and hands they wore long gloves, or *gauntlets*.

This is an old saying, — "For a glove to be good, three nations must contribute to it: Spain to dress the leather, France to cut it, and England to sew it."

Good gloves are made in our country, but the finest of ladies' gloves come from France.

Gloves have been used in many different ways. Long ago they were sometimes given to those who were in great sorrow. This was a sign of sympathy. Sometimes they were given on joyful occasions. A warrior often threw down his glove in front of another as a challenge to battle.

WHAT THE BUTTONS TOLD

During the afternoon Hortense had been sitting in the shade of a great maple tree stringing buttons. She had collected many kinds, and had wondered where they had come from and what they were made of.

When bedtime came, she kissed her mother good night and hung the string of buttons on a nail. She did not expect to see them again until the next morning, but many wonderful things happen during the night, as all girls and boys know.

A strange procession was marching across the bed! The members of the company were in single file. They halted just in front of Hortense's pillow, forming a line that stretched halfway across the bed.

Now in a twinkling the two in front were changed into human beings! The first wore a long, flowing robe that reached to his feet.

It was loosely fastened at the waist by means of a belt, or *girdle*. Not a button was to be seen about his clothing. The second was dressed as are the men whom you see every day.

"You see," said he of the flowing robe, speaking to Hortense, "what our friends, the buttons, have done to change the style of dress. In Persia and other countries of the far East, buttons are not used as commonly as they are here. For a long time after they were invented they were used as ornaments, but finally their real value was seen."

"Yes," said the second, "people in this country would not know how to get along without buttons. As you know, Hortense, they are of all shapes, sizes, and colors, and many kinds There are more than sixteen thousand persons employed in our country making them. But I must let the buttons tell their own story, for that is why they are here."

Upon hearing this, the first button moved forward a step or two. Hortense remembered that her mother had said that this one had been in the family for several generations.

"I was once in constant use," said he. "That was many years ago, however. In those days most buttons, like myself, were made of wood. Some were covered with cloth, and some were not. I was made by Benjamin Randolph who kept a shop on Chestnut Street in Philadelphia. He advertised that he made 'buttons of apple, holly, and laurel wood, hard and clear!' That was more than one hundred years ago. There were but two button shops in the city then." The button seemed quite exhausted by his long talk, so the next advanced. This one was very pretty, and Hortense had often admired it. You have seen many such, I know.

"I was made of *mother-of-pearl*," said the button. "I was a part of the lining of a most beautiful shell about as large as a dinner plate. The shell was quite flat, and consisted of two parts. Over me there rolled for many years the waves of the Indian Ocean. About me were beds of coral, some draped with festoons of sea-weed. Fish of many kinds swam idly about the ocean halls, or darted away like a flash when a shark appeared.

"One day a dark-skinned man, with a stone fastened to one foot and a rope about his waist, dropped from a boat into the water. He took me from my home on the rocks and placed me with others in a basket. After a time we were sent to this country and made into buttons."

"Are there other kinds of pearl buttons?" asked Hortense, speaking for the first time.

"Yes," replied the button. "Some are made of *fresh-water pearl*. This, also, comes from shells. Many of them are gathered in the Mississippi River."

The next in line now took up the conversation.

"I am called *horn*," said he, "although I am a part of the *hoof* of an ox. How often I have pounded the ground when the great band of cattle *stampeded* across the plains of Texas! You should see the *cowboys* swing their long *lassoes* over their heads and catch the cattle when they are to be *branded*.

"The cattle are finally loaded on cars and carried to Chicago for beef. The hoofs are put

into boiling water to soften them, and are then shaped into buttons by machinery."

Now a bright-colored button stepped forward.

"Where do you come from?" asked Hortense.

"My home was in South America," replied the button. "You know that in the tropical parts of that continent many palm trees grow. One kind bears a nut called the ivory nut. It is about as large as a hen's egg, and the kernel is very hard. Many grow together inside a great case. I am part of one of those nuts. With many, many others the nut to which I belonged was picked and sent to this country. All were shelled and then sawed up into various shapes. My natural color is white, but I was dyed."

"Isn't there another kind of ivory?" inquired Hortense.

"To be sure," replied her friend.

"I am *vegetable ivory*. *Real* ivory comes from the tusks of elephants. We are very much alike in color and hardness, however."

A button looking a little like gold now took its place in the line. Hortense had received

this one from her brother when he was home on a visit three years ago.

"Like many another *brass button* I have had some wonderful experiences," he began. "Great numbers of our family are in the public service. You find us in the navy and in the army. We are on the suits of the policemen and the train men.

"As you know, I was on the cap of your brother when the great battleship *Oregon* left San Francisco for the West Indies. For many days we sped southward. At last we rounded the tip of South America. Then we steamed to the north, and after a journey of sixty-eight days we reached Key West, Florida."

"Is brass dug from the earth?" asked Hortense.

"No," said the button. "Brass is made from copper and zinc. These are mixed."

"Hortense!" called a well-known voice.

She opened her eyes to find her mother's smiling face bending over her, and the sunshine streaming in through the window.

"Where are they?" asked Hortense, as she

looked about her. Then she told her mother all about it.

"That is very interesting," said Mrs. Gibbons, "and it is all true. Not all of the buttons, however, told their story. Some are made of glass, porcelain, iron, rubber, rice, silver, gold, and even potato."

"Oh, mother!" cried Hortense, "how could a button be made of potato?"

"The potato is hardened by being treated with certain acids," returned Mrs. Gibbons.

"A great deal of work is required in making the best of buttons. The holes are drilled by machinery. Some of the buttons are highly polished. After they are finished, girls sort them, sew them on cards, and pack them in pasteboard boxes."

THE LAUNDRY

After we have secured our articles of clothing, they must be kept in repair and kept clean. This is an old saying, "Cleanliness is next to godliness." It is very important that we keep both our bodies and our clothes clean. This does not mean that we should never have our hands and our garments soiled. There is much work to do that will soil both. After the work is finished the dirt can be removed, and we are none the worse off on account of it.

It requires a great deal of time and labor to launder the clothing of a family. If you live in the country, you know that Monday is the regular weekly "wash day." It is a busy day, too, and the family is early astir.

Up and down the clothes are rubbed on the *washboard*. After a time they are put into the *boiler* and boiled. Then comes another washing and rubbing. After rinsing and blu-

ing, the water is wrung from the clothes. This used to be done by hand. Now *wringers* are found in most homes.

Next comes the starching, and the clothes are then hung on a line to dry. If the wind blows, there is a constant flap, flap, along the line. On some days the clothes dry very slowly. Why?

After sprinkling, the clothes are ready to be ironed. In large families washing and ironing are seldom done on the same day.

A rousing fire is needed to keep the *flat-irons* hot, and the boys must bring in plenty of wood or coal. Often the mother bakes on "ironing day." Do you see why?

Some people pay little attention to their washing. This is true of the Eskimos, the Indians, and those who live on burning deserts. Give a reason for this.

In some places the women gather at clear streams to do their washing. After the garments are washed, they are placed on the stones and grass to dry.

Most boys and girls who live in the country

would be surprised to see a laundry wagon stop at the door twice every week. This is what city children see. In cities some or all of the family washing is quite commonly "sent out." This is one of the many ways in which country life and city life differ. Name some other points of difference.

Many wagons collect clothes for the large laundries. Each wagon has its particular "route." The bundles are carried to the laundries, where they are opened and a record of what each contains is made. Each article that has been to the laundry before has a mark on it that shows to whom it belongs. Each piece is examined closely, and if any is found without a mark, it is given one. As fast as the clothes are taken from the bundles, they are thrown on a pile containing others of the same kind.

In a laundry you will not see women washing clothes on washboards. The clothes are washed in tubs that look somewhat like barrels. When the clothes are put into these, the barrels are closed and are turned by machinery.

The wringer is even more wonderful than

the washer. It is shaped like a cheese, but is much larger. Into this the clothes are put, and then the wringer is whirled around so rapidly that it seems to stand still. This rapid motion throws the water from the clothes. It flies out of small holes in the side of the machine. Take up one of the garments and wring it by hand. Not a bit of water can be squeezed from it. Do you think a large yard is needed to dry the clothes of so many families? The laundryman does not use sunshine for this purpose. The clothes are put into small spaces or rooms called *driers*. These are heated by steam pipes, and the clothes dry rapidly.

These great rollers are flatirons! Touch them, and you will see that they are hot. Sheets, pillow slips, towels, table cloths, and similar things are run through them. Such articles are called *flat pieces*. The other "pieces" are ironed much as in the home.

When the work of laundering has been done all of the articles of the same kind are once more together. Along the walls are rows of

shelves. On these are marks like those on the clothes. Everything having the same mark is put in the same place.

Now the clothes are ready to be put up into bundles, and the wrappers must be very careful. The slips that were made out at the beginning are examined to see whether the goods on the shelf are the same as those on the list.

To each bundle a paper slip is tied. This gives the owner's name, residence, the articles in the bundle, and the price. Again the delivery wagons are loaded, and the laundry is delivered at the doors of the owners.

Think how much time and labor are saved by having this work done outside of the home. It is more important in the city than in the country. Why? You have seen once more how labor is divided and how each has his part to do in the work of the world.

DYES AND DYEING

God has clothed many of the plants and animals in the most beautiful colors. What gorgeous suits I have seen when walking through forest and field! Violets dressed in purple. Buttercups in the brightest of yellow. Honeysuckles spreading their robes of red over decaying logs and stumps. Have you ever seen them?

The flowers are no more beautiful than the birds, insects, and fishes.

We all love beautiful things, and man first learned to color *his* dress by making use of plants and animals. The coloring of cloth is called *dyeing*.

You have read in the Bible of the purple robes of priests and kings. This shows how old the custom of dyeing is.

Probably your great grandmother, if she lived in the country, dyed yarn and many of

the garments belonging to the family. In those days people did not go to the drug stores for packages of dyes. They gathered bark and leaves instead. The bark of the hickory and of the red oak tree was often used. Have you ever seen a hickory tree?

Many colors were made even in those times. When purple was wanted, the juice of the petals of the iris was used. The bark of the sassafras gave orange or yellow. By boiling the leaves of the sorrel and certain other things with the cloth, black was obtained. The juice of the golden-rod mixed with indigo gave green. What two colors do you use when you want to make green?

The indigo plant has been used for a long time. It grows in India and Central America. It used to be raised in the Southern States before cotton growing became so profitable. Logwood, Brazil wood, and woods from other tropical trees are shipped to our country. These are called *dyewoods*.

When the Spaniards went to Mexico, they found that the people of that country made a

scarlet dye from an insect. This is called the cochineal, and it lives on the leaves of the cactus plant. Of course the Spaniards introduced this dye into their own country, and so its use gradually spread.

With a squirrel's tail the Mexicans brush the female insects from the leaves. These are then dried in ovens or put into boiling water. The bodies are ground into powder, from which the dye is made. The cochineal is not used so extensively now as it once was. To-day it is not common to dye clothing in the home. This is usually done by the great establishments that make thread, yarn, and cloth.

The dye which is generally used now is called *aniline*. It is made from coal tar, and every shade is obtained. It is interesting to know that cloth made of two materials, such as cotton and wool, cannot be dyed at one operation. The dye acts in different ways on different materials, and so the same piece of cloth often has to be dyed more than once.

AN OSTRICH FARM

HARRIET and her parents spent last winter in southern California, and Harriet saw many new and interesting things there.

It was so comfortable to have warm, sunny days in midwinter, with no snowstorms and no biting winds. She was delighted to see the golden oranges hanging on the trees and to be able to pick them herself. She saw roses of many kinds blooming on cottage walls and roofs, and at the same time she could see lofty mountains wearing caps of snow.

One day when they were out riding, they saw a sign which read, "South Pasadena Ostrich Farm."

"What kind of farm is an *ostrich* farm?" asked Harriet, in surprise.

"Why," replied Mr. Gibson, "it is a farm where ostriches are raised."

"But why do they raise ostriches?" continued Harriet.

Fig. 53. — A Flock of Ostriches. South Pasadena Ostrich Farm, California.

Her father pointed to Mrs. Gibson's hat.

"Oh," said Harriet, "do they raise the ostriches just to get the feathers? How strange! Do the birds look like that?" she asked, pointing to a painting on the high fence.

"Yes," answered her father, "that is a good representation of them."

On their way home they decided to visit the strange farm as soon as possible.

One evening not long after, Harriet's father said that some of the ostriches would be plucked the next day, so they concluded to go then.

"Oh, what funny-looking birds!" cried Harriet, as she took her first look at them.

It certainly was a strange sight. She saw a flock of birds, each one of which was taller than a tall man. They were soberly parading back and forth as though they were on exhibition. They twisted their long necks and tossed their heads from side to side in the most vain manner. It was quite laughable to watch them.

Some of the birds were gray and some were glossy black except the wings and tail. These were white.

"Do they ever fly over the fence?" asked Harriet.

"No," replied the man who was showing the visitors about. "Ostriches cannot fly, but the wings help the wild ones in running. In some places men mounted on horseback pursue them. Only a swift horse can catch one.

"The deserts of Arabia and Africa are the home of the ostrich," continued the man, "but they are found in other places also."

"Do you remember the camels that you saw at the circus last year?" inquired Mr. Gibson.

"Oh, yes," replied Harriet, wondering what that had to do with the queer birds before her.

"Probably at this very time long *caravans* of camels are slowly making their way across the dreary Sahara. They stop at the fertile *oases* scattered along the winding way. Here they rest beneath the groves of date-palm trees, and secure a supply of water. Week after week they travel over the trackless sands until they reach the region of Timbuktu or Lake Chad. Find these on the map. Among

the things with which the camels are loaded for the long return journey are *ostrich feathers*. Natives dressed in ostrich skins approach the birds and shoot them. The feathers they sell to the traders who come in the caravans."

"How wonderful!" cried Harriet. "Just think of men going off into a desert in search of plumes for hats!"

"Ostrich plumes are worn in many parts of the world," said Mr. Gibson. "There is a great demand for them, although they are expensive."

"Now I will show you some of the baby birds," said the man in charge.

Although but a month old the little ostriches were as large as full-grown chickens. The man told them that the birds grow about one foot each month for the first six months of their lives.

"Here is one of the eggs," said he, handing it to Harriet. She opened her eyes in astonishment. It was about six inches long, and equal in bulk to about two dozen hens' eggs.

"Are they good to eat?" she asked.

"Yes," replied the man, "but they are rather expensive. They are worth $5 each."

"I think we will not order them for lunch," remarked Mr. Gibson.

"Where do the ostriches build their nests?" inquired Harriet.

"Ostriches do not *build* nests," replied the man.

Harriet looked puzzled.

"They simply scoop out holes in the sand, using their toes. In the hole or nest they lay from ten to fifteen eggs. The female bird sits during the day because, being gray, she cannot be easily seen then. The male bird sits at night."

"Are there any other ostrich farms?" asked Mrs. Gibson.

"In South Africa there are many farms, and great quantities of the feathers are produced there," was the reply.

The visitors now went to see one of the birds plucked. It was driven into a sort of pen, and a bag was drawn over its head.

"Why do you do that?" asked Harriet

"It keeps the bird from jumping about and injuring us. It would be very difficult to do the work unless we covered its head."

The men pulled some of the feathers, but the larger number were cut. This was done in such a way as to leave about an inch of the quill in the body. All of the time the ostrich kept up a mournful roaring.

"Does the plucking hurt the bird?" asked Mr. Gibson.

"Very little," returned the man. "The feathers which we pluck would soon drop if not pulled. The birds are plucked once in nine months. Each bird yields about one pound of feathers a year. The cheapest ones are worth about $5 a pound. Such feathers as these, just clipped from the wings and tail, are worth $200 a pound."

"Are the feathers ready to use as soon as they are plucked?" asked Harriet.

"Oh, no," answered the man. "Some are dyed, bleached, curled, and treated in other ways before being sold."

The man in charge now had the birds fed.

In some of the yards alfalfa was placed. This is a sort of clover which grows in the West. In other yards corn was scattered. How the ostriches did run to get the food! When Harriet approached too near the fence, some of the

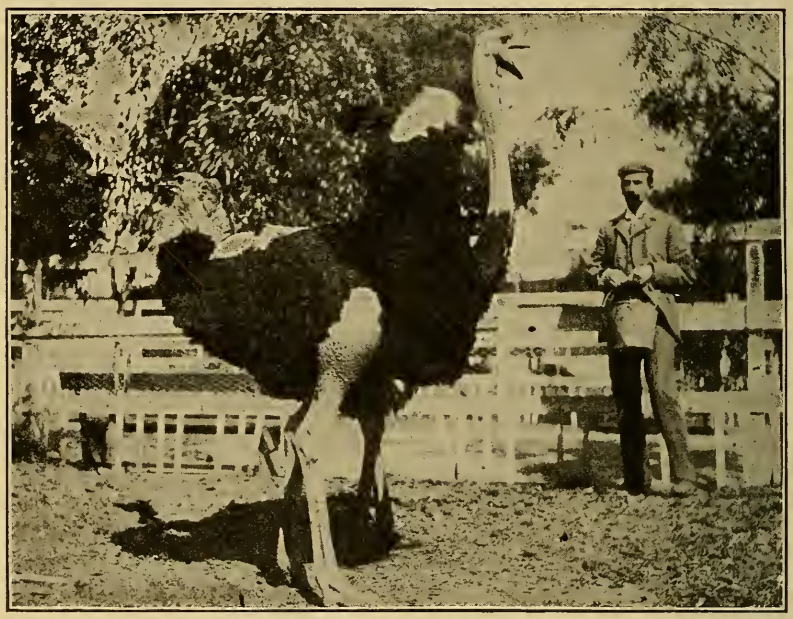


Fig. 54.—Feeding the Ostriches.

birds would raise their wings and, with open beaks, come toward her hissing.

"They are not really angry," said the man, "but they seem to take pleasure in showing off."

Harriet learned that ostriches will pick up

any bright objects which are small enough for them to swallow.

As a farewell gift the ostriches were fed oranges. Mr. Gibson would hold the fruit as high as he could reach, and the great birds would easily take it from his hand.

"Now," said Harriet, as they walked out, "when I see ostrich plumes and boas worn, I shall think of these very strange birds as they march about on the ostrich farm or roam over the sands of their desert home."

GOLD

You know that rings, pins, brooches, bracelets, necklaces, and other ornaments are very commonly worn. Indeed, it has been the custom to wear such things for ages, and wherever you go you will find ornaments of some sort in use. Many different things are used in making these articles. I shall tell you about a very few of them.

Gold is called a *precious metal.* Why? It comes from the rocks of the earth, as many other useful things do, and it has a wonderful history.

Have you ever been out in the fields or hills where there are great masses of rock? If you have, you may have observed small cracks in them. The rocks of which our great mountains are made contain many cracks. Deep down in the earth the rocks are very hot. The rain water works its way down these open-

ings, and so becomes heated. You have seen water *dissolve* sugar and salt. Hot water can dissolve gold, but of course very slowly.

When we heat water in a teakettle, *steam* finally forms, and this will lift some of the water out of the spout or cause the cover to rattle. In much the same way the steam far down in the rocks forces the hot water up the cracks toward the surface of the earth. As the water cools, the gold is *deposited* along the sides of the opening, forming a *vein.*

Now the streams begin their work. Have you ever watched a brook cut away the soil along its banks? Streams big and little cut rock as well as soil. The rock is worn away very slowly, however.

Little by little the rocks containing the gold are worn down and the pieces are carried along by the streams. The pieces of gold are much heavier than pieces of rock of the same size. On this account they collect in the pools along the beds of the streams. When the particles are very small, they are called *gold dust;* larger pieces are called *nuggets.*

In the year 1848 a man by the name of James Marshall discovered gold in the bed of a stream in California. Locate this state on a map. People had found gold long, long before this time, but the news of the discovery spread like wildfire. Men in all parts of the world left their homes and hurried to this land of gold.

You must know that in those days there were no railroads connecting the eastern and the western parts of our country. What do you suppose the gold seekers did? They formed companies. Each man had a great wagon covered with white cloth. These wagons were called *prairie schooners*. Why? Attached to the wagons were oxen. How slowly they crept across the plains and over the mountains and deserts. The journey took several months.

Some of the gold hunters sailed from our eastern coast in ships. Trace their journey to California.

Many of the miners obtained large amounts of gold, and many others obtained very little. At first they dipped up sand in pans from the

streams. They rocked the pans to and fro, and the sand, being light, was carried off by the water. The particles of gold, being heavy, remained in the pan.

Gold is not always found in separate layers or veins. It often forms a part of a rock, and is separated from the rock by grinding or crushing the whole mass. The digging of the rocks from the earth is called *mining*. What is the most useful substance mined?

Gold is produced in many parts of our country and in many other countries. South Africa, Australia, and Russia are some of these.

Because gold can easily be hammered into thin sheets it can be used in very many ways. Of course it is not all used in making ornaments. Name other uses.

DIAMONDS

WHO has not admired diamonds as they sparkle in the light? How the colors change as the light falls upon them in different ways! Like gold, diamonds come from the earth, and most of them come from far-away South Africa.

Diamonds have been known for a very long time. The Romans prized them highly and used to journey to India for them. They are found in India to-day as well as in Brazil, and a few have been found in our own country.

What would you think of having a handful of these beautiful stones to play with? It is said that some of the Boer children in South Africa collected them, thinking that they were simply pretty pebbles.

Long ago the Boers lived in Holland. Do you know where Holland is? They were not allowed to worship God in their own way, and so they left their homes and settled in Africa.

What people came to America for the same reason?

At first the Boers settled near the coast, but other people claimed the land, so they moved back into a region not so fertile.

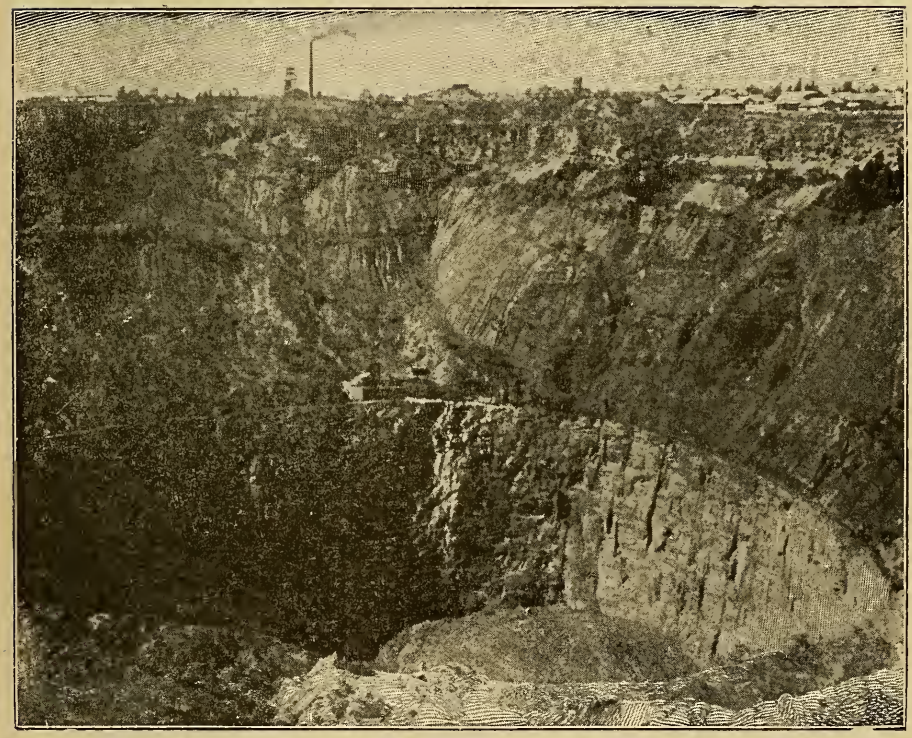


Fig. 55.—A Diamond Mine at Kimberley, South Africa

One evening a traveler stopped at a Boer farmhouse. He saw the pretty stones which the children were playing with, and he recog-

nized them as diamonds. Of course the news spread, and people came to dig the precious stones from the earth.

The diamonds are found in a sort of blue soil. Great holes or pits have been dug in

FIG. 56.—The Largest Diamond ever found in the Kimberley Mines. It weighed 503 carats. Found in De Beers Mine, June 8, 1896.

searching for them. This blue earth is lifted to the surface by machinery and washed, screened, and carefully sorted. As the stones are very valuable, the miners are searched each night when they finish work.

Nearly all of the diamond mines are owned

by one company. Each year there is a great sale, and merchants go from different parts of the world to purchase the gems.

When a diamond is dug from the earth, it is not ready to be used as a setting. It must first be carefully cut and then polished. This is very important work, as a single stone is often worth many thousand dollars.

The little diamond that sparkles in a ring or a pin might tell an interesting story if it could speak.

PEARLS

"How beautiful pearls are!" said Jessie, as she examined her Aunt Mary's new pin. "I sometimes think they look as dewdrops do, when they cling to the blades of grass in the early morning."

"People once believed that pearls *were* dewdrops," replied her aunt. "In some mysterious way the dew was changed into pearls. They thought that the dimness and the flaws that we see in some pearls were caused by impurities in the dew."

"What a strange idea!" said Maud.

"There was another belief equally strange," continued her aunt. "Some thought that as the tears of the angels fell from heaven to earth they became pearls."

"That was a beautiful thought," said Alice, "but please tell us how pearls *are* formed, Aunt Mary."

The girls prepared to listen, for they always enjoyed their aunt's stories. "Pearls," she said, "are obtained from *pearl oysters*. Some of the oysters live in the ocean and some in fresh water. Although pearls are so beautiful and give us so much pleasure, they probably give pain to the oysters."

"How is that?" asked Maud, in surprise.

"When a grain of sand or any other small object gets into the shell of an oyster, it feels uncomfortable and annoys the animal. The oyster then proceeds to cover it up with the substance which we call pearl. Now you see why pearls are somewhat rounded.

"Long ago our Chinese neighbors discovered this, and so they made the oysters work for them."

"What do you mean?" inquired Alice.

"They opened the shells of the little creatures and placed small objects within them. When the pearls had been formed, they took them out.

"Diamonds, rubies, emeralds, and other gems come from the earth, and must be carefully

polished before they can be used. Pearls come from nature perfect."

"Have they been in use a long time, Aunt Mary?" asked Jessie.

"Yes, a long, long time," replied her aunt. "Some of the rulers of Persia and other Eastern lands have had great quantities of beautiful pearls. Not all pearls are like this one. Some are rose colored, some pink, some yellow, and some are black.

"Along the Persian Gulf there are pearl fisheries. There are others on the coast of the island of Ceylon and Australia. Great numbers of fresh-water pearls are obtained from the upper Mississippi River. In gathering pearl oysters from the sea, men are exposed to great danger."

"Why is the work dangerous?" inquired Maud.

"You must know that the home of the oyster is on the ocean floor, many feet below the surface of the water. In order to get them, men must dive into the water for them. On this account they are called *divers*.

"The men go to the fishing grounds in boats. A stone is attached to the foot of the diver, and a rope is fastened to his waist. He then jumps into the water. Down, down he goes, and he soon reaches the bottom. Curious plants hang in festoons from the rocks. Beautiful coral of many forms can be seen. Fishes float lazily about, or dart like arrows from rock to rock."

"How beautiful!" exclaimed the girls.

"Yes, it *is* beautiful; but the diver has little time to think of that. He can remain under water only about a minute, and he must work rapidly. At any instant a terrible shark may appear, or the rope which is fastened to his waist may be cut on some sharp rock. Besides this, the water presses upon him with so great force that it causes him pain.

"He gathers the oysters as fast as he can, puts them into a bag or basket, and at a signal his comrades pull him up to the boat."

"I have seen pictures of men in diving suits," said Alice.

"These are sometimes used by white men,"

said her aunt. "They are made of rubber. A strong metal cap covers the head, and is screwed to a plate just above the shoulders. To each foot a heavy weight is fastened, so that the diver may sink rapidly."

"How can the divers breathe?" asked Helen.

"One end of a long rubber tube is fastened to the metal cap. The other end is attached to a pump in the boat. Fresh air is pumped through this tube. Even with these suits, men cannot remain under water very long, and they never go down very far, for they cannot endure the great pressure."

"Please tell us how the shells are handled after they are taken to land," said Maud.

"They are spread out on the shore, washed, and carefully examined for the precious pearls. You must not suppose that each oyster contains a pearl. Sometimes many are opened without finding one. Often the fishers can tell by the appearance of a shell whether or not it contains a pearl. When a particularly valuable one is found, the diver is sometimes paid more than his regular wages.

"You may never see a pearl oyster, or the fishers at their work, but you are now somewhat acquainted with both. When you see beautiful pearls worn, you may think of the divers gathering the shells from the ocean floor, with the blue waters above their heads."

Printed in the United States of America.

THE following pages contain advertisements of books by the same author or on kindred subjects.

BAKER AND CARPENTER

LANGUAGE READER SERIES

First Year Language Reader

By FRANKLIN T. BAKER, Professor of the English Language and Literature in Teachers College; GEORGE R. CARPENTER, Professor of Rhetoric and English Composition in Columbia University; and MISS KATHERINE B. OWEN, Instructor in the Charlton School, New York City. 152 pages, 25 cents

Second Year Language Reader

By FRANKLIN T. BAKER, GEORGE R. CARPENTER, and MISS KATHERINE B. OWEN. 165 pages, 30 cents

Third Year Language Reader

By FRANKLIN T. BAKER, GEORGE R. CARPENTER, and MISS MARY E. BROOKS, Supervisor of Primary Work in Brooklyn. 300 pages, 40 cents

Fourth Year Language Reader

By FRANKLIN T. BAKER, GEORGE R. CARPENTER, and MISS IDA E. ROBBINS, Instructor in Horace Mann School, New York City. 359 pages, 40 cents

Fifth Year Language Reader

By FRANKLIN T. BAKER, GEORGE R. CARPENTER, and MISS MARY F. KIRCHWEY, Instructor in Horace Mann School, New York City. 492 pages, 45 cents

Sixth Year Language Reader

By FRANKLIN T. BAKER, GEORGE R. CARPENTER, and MISS JENNIE F. OWENS, Instructor in Jersey City Training School. 505 pages, 50 cents

Each volume 12mo. Cloth

The *distinctive feature* of the LANGUAGE READER SERIES is that it includes in one book for each of the first six grades all the work in English needed for the grade, except the supplementary reading.

THE MACMILLAN COMPANY

64-66 Fifth Avenue, New York

BOSTON CHICAGO SAN FRANCISCO ATLANTA

PIONEER HISTORY SERIES

By CHARLES A. McMURRY

Designed as a complete series of early history stories of the Eastern, Middle, and Western States, suitable as an introduction for children to American History. Illustrated and equipped with maps.

Cloth 12mo 40 cents each

Pioneers on Land and Sea

The first of the three volumes deals with the chief ocean explorers, Columbus and Magellan, and with the pioneers of the Eastern States, Canada, and Mexico, such as Champlain, Smith, Hudson, De Leon, Cortes. These stories furnish the gateway through which the children of our Atlantic States should enter the fields of History. The attempt is to render these complete and interesting stories, making the experiences of pioneer life as graphic and real as possible.

Pioneers of the Mississippi Valley

Such men as La Salle, Boone, Robertson, George Rogers Clark, Lincoln, and Sevier supply a group of simple biographical stories which give the children a remarkably good introduction to History. Teachers are beginning to believe that children should begin with tales of their own home and of neighboring states, and then move outward from this centre. For eastern children these stories form a very suitable continuation to "Pioneers on Land and Sea," and *vice versa.*

Pioneers of the Rocky Mountains and the West

In some respects these western stories are more interesting and striking than those of the states farther east, because of their physical surroundings. Children of the Western or Mountain States should enjoy these stories first. The various exploring expeditions which opened up the routes across the plains and mountains are full of interesting and instructive incidents and of heroic enterprise. The chief figures in these stories are men of the most striking and admirable qualities, and the difficulties and dangers which they overcame place them among the heroes who will always attract and instruct American children. Incidentally, these narratives give the best of all introductions to western geography. They are largely made up from source materials furnished by the explorers themselves.

THE MACMILLAN COMPANY

64-66 FIFTH AVENUE, NEW YORK

BOSTON CHICAGO SAN FRANCISCO ATLANTA

Source Readers in American History

SELECTED AND ANNOTATED BY

ALBERT BUSHNELL HART, of Harvard University

IN FOUR VOLUMES. ILLUSTRATED

No. I.	**Colonial Children**	**Price 40 cents,**
No. II.	**Camps and Firesides in the Revolution.**	**Price 50 cents,**
No. III.	**How Our Grandfathers Lived**	**Price 60 cents,**
No. IV.	**Romance of the Civil War**	**Price 60 cents,**

Source Book of American History

FOR SCHOOLS AND READERS

Edited by ALBERT BUSHNELL HART, Ph.D.

Editor of "AMERICAN HISTORY TOLD BY CONTEMPORARIES," etc.

Cloth. 12mo. 60 cents.

"A volume that we have examined with close attention and can commend with confidence. In about four hundred pages of text, it finds room for something like one hundred and fifty examples of the original material of our history, from the voyages of Columbus to the Spanish-American War. The selections are judiciously made, edited, and annotated; the introductory chapters for teachers are of the most helpful sort; and the book is sold at so low a price that no secondary school in which American history is taught can find a reasonable excuse for not employing it as an adjunct to the regular manual."—*The Dial.*

THE MACMILLAN COMPANY

64–66 FIFTH AVENUE, NEW YORK

BOSTON CHICAGO SAN FRANCISCO ATLANTA